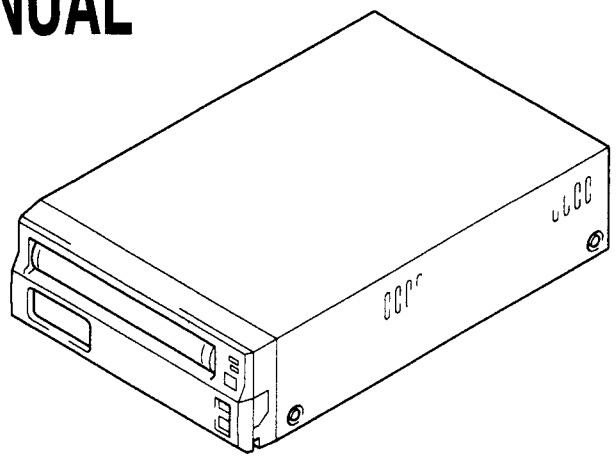
SVT-124P

SERVICE MANUAL

E Model



SPECIFICATIONS

General

Recording method	Dual-head rotating helical scanning system
Audio recording	In 3-, 12- and 24-hour modes
Tape speed	23.39 mm/sec (3-hour mode)
Specified video cassette tape	VHS 1/2 inch video cassette tape
Recording/playback time	3, 12 and 24 (when using E-180 tape)
Fast-forward/rewind time	Approx. 2.5 minutes (when using E-180 tape)
Color system	PAL color TV system

Video

Recording method	Luminance signal: FM method Color signal: Low-pass band-pass Transformation direct recording method
Input	BNC: 1 Vp-p, 75 ohms unbalanced
Output	BNC: 1 Vp-p, 75 ohms unbalanced
S/N	more than 44 dB
Horizontal resolution	Black & white mode: 350 lines Color mode: 240 lines

Audio

Input	315 mV (–7.8 dBs), phono jack 47 kilohms unbalanced
Output	315 mV (–7.8 dBs), phono jack 600 ohms unbalanced
Microphone input	–60 dBs, ø3.5 mm minijack, 600 ohms
S/N	42 dB

Connector

Alarm input	Low level
Alarm output	+5 V, 5.7 kilohms (Low active)
Switch output	+5 V, 5.7 kilohms (Low active)
Tape end output	+5 V, 5.7 kilohms (Low active)
Warning output	+5 V, 5.7 kilohms (Low active)
External timer input	Low level
Remote control input	ø3.5 mm stereo minijack

Other specifications

Operating temperature range	5°C to 40°C
Operating humidity range	80% or less
Power supply	220 - 240 V AC, 50 Hz
Power consumption	15 W
External dimensions	Approx. 240 × 96.5 × 333 mm (w/h/d) (9 1/2 × 3 7/8 × 13 1/8 in.)
Mass	Approx. 3.8 kg (8 lb 6 oz)

Supplied accessory

AC power cord (1)

Optional accessory

SVT-RM10 Remote Control Unit

Design and specifications are subject to change without notice.

S VHS VIDEO CASSETTE RECORDER

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Safety Related Components Warning

Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

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Sony Corporation expressly prohibits the duplication of any portion of this manual or the use thereof for any purpose other than the operation or maintenance of the equipment described in this manual without the express written permission of Sony Corporation.

CAUTION

Danger of explosion if battery is incorrectly replaced.

Replace only with the same or equivalent type recommended by the manufacturer.
Dispose of used batteries according to the manufacturer's instructions.

ADVARSEL

Lithiumbatteri - Eksplosjonsfare.
Ved utskifting benyttes kun batteri som anbefalt av apparatfabrikanten.
Brukt batteri returneres apparatleverandøren.

Vorsicht!

Explosionsgefahr bei unsachgemäßem Austausch der Batterie.

Ersatz nur durch denselben oder einen vom Hersteller empfohlenen ähnlichen Typ.
Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

VARNING

Explosionsfara vid felaktigt batteribyte.
Använd samma batterityp eller en likvärdig typ som rekommenderas av apparattillverkaren.
Kassera använt batteri enligt gällande föreskrifter.

ATTENTION

Il y a danger d'explosion s'il y a remplacement incorrect de la batterie.

Remplacer uniquement avec une batterie du même type ou d'un type équivalent recommandé par le constructeur.
Mettre au rebut les batteries usagées conformément aux instructions du fabricant.

VAROITUS

Paristo voi räjähtää jos se on virheellisesti asennettu.
Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin.
Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

ADVARSEL!

Lithiumbatteri-Eksplosionsfare ved fejlagtig håndtering.
Udskiftning må kun ske med batteri af samme fabrikat og type.
Levér det brugte batteri tilbage til leverandøren.

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3-194-198-01(1)

Videocassette Recorder

SECTION 1
OPERATING INSTRUCTIONS

This section is extracted from operation manual.

Operating Instructions page 2
Before operating the unit, please read this manual thoroughly, and retain it for future reference.

SVT-124P

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WARNING

To prevent fire or shock hazard, do not expose the unit to rain or moisture.

To avoid electrical shock, do not open the cabinet. Refer servicing to qualified personnel only.

What is Time Lapse Video?

- A normal VCR records 50 fields per second, while this time lapse VCR records in a range from 5.6 to 10 fields per second. Through reduction of the number of fields recorded per second, this VCR is capable of recording for extended periods of time on a standard video tape (up to a maximum of 27 hours).
- As a result, this VCR is extremely useful for long-term monitoring or recording events that take place slowly (such as the blooming of a flower).
- If a tape that has been recorded in time lapse mode is played back in the normal three-hour mode, the speed of the tape will be increased 5 to 9 times, depending on the speed the original recording was made at, so that the slow changes that were recorded can be viewed at a much faster speed.

CAUTION

The format used for time lapse recording in this video cassette recorder differs from the regular VHS video format. Cassettes recorded in two-hour mode on this unit can be viewed on a normal VHS video cassette rcorder. However, cassettes recorded in other modes may show some picture noise when played on a normal VHS video cassette recorder.

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Precautions

On safety

- Operate the unit on 220 - 240 V AC, 50 Hz only.
- The nameplate indicating operating voltage, power consumption, etc., is located on the rear of the unit.
- Should any solid object or liquid fall into the cabinet, turn off the power, unplug the unit and have it checked by qualified personnel before operating it any further.
- Do not drop or place heavy objects on the power cord. If the power cord is damaged, turn off the power immediately. It is dangerous to use the unit with a damaged power cord.
- Connect the power cord to the wall AC outlet. For connecting the power source, see "Connecting a Camera, Monitor and Microphone" on page 8.
- Unplug the unit from the wall outlet if it is not to be used for several days or more.
- Disconnect the power cord from the wall AC outlet by grasping the plug, not by pulling the cord.

On installation

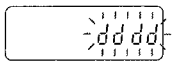
- Do not place a heavy object on the unit.
- Allow adequate air circulation to prevent internal heat build-up.
  Do not place the unit on surfaces (rugs, blankets, etc.) or near materials (curtains, draperies) that may block the ventilation slots.
- Do not install the unit in a location near heat sources such as radiators or air ducts.
- Place the unit to avoid direct sunlight.
- Do not install the unit in a place subject to mechanical vibration or shock.
- Do not put magnetic objects close to the unit and cassette tape. Magnetic fields may affect the color reproduction of the unit and cause distortion.
- Whenever you changed the place of the installation, degauss the unit.
- The unit is designed for operation in a horizontal position.
  Do not install it in an inclined position.

On operation

When the unit is not in use, turn the power off to conserve energy and to extend its life.

On moisture condensation

If the unit is brought directly from a cold to a warm location, moisture may condense on the video head drum. In this condition, the tape may adhere to the head drum and cause serious damage to the head. To avoid damage caused by moisture condensation, be sure not to leave a cassette inside the compartment when the unit will not be used. If moisture condensation is present, the "dddd" indicator flashes in the display window and the unit will not operate. When the "dddd" indicator disappears, you can operate the unit.



On video cassettes

Remove and store video cassettes after recording or playback.

On cleaning

As a safety precaution, unplug the unit before cleaning it.

- To keep the unit looking brand-new, periodically clean it with a mild detergent solution. Never use strong solvents such as thinner or benzine, or abrasive cleaners since they will damage the cabinet.
  When cleaning, keep liquid away from electrical contacts and connectors.
- When there is a buildup of dust on air vents, use a vacuum cleaner to remove it.

On repacking

- Before repacking, disconnect all cables and connecting cords.
- Do not throw away the carton and packing materials. They make an ideal container with which to transport the unit. When shipping the unit to another location, repack it.

On transportation

When transporting the unit, protect it from vibration and impact.

If you have any questions about this unit, contact your authorized Sony dealer.

Features

Field recording/field playback
Because single fields can be recorded one by one in time lapse mode and all fields can be viewed separately during playback, you can record more information.

Audio recording in 12-/24-mode
You can record audio information with video information even in 12- or 24-hour mode and listen to it by selecting audio mode during playback.

Various recording functions
- **Repeat recording:** When the tape reaches the end, the VCR rewinds the tape and starts recording again from the beginning of the tape.
- **Timer recording:** You can set the timer on daily recording or weekly recording.
- **Alarm recording:** If an externally connected alarm sensor is triggered, you can make a complete recording of the situation that triggered the alarm.

Mode settings on monitor
You can set the modes for all functions, such as the internal timer setting, the alarm recording mode settings, etc. on the monitor.

Used time indicator
This VCR shows used time of head drum and power on time on the monitor screen.

Alarm scan function
You can scan the alarm recording and play it back for first five seconds.

Clog detection
The VCR always checks that the video signal is recorded without problem (in time lapse mode only). If the recording cannot be made properly because the recording head has become clogged, the VCR will give a warning.

Forward field advance
This VCR offers improved search functions with the ability to move forwards between fields.

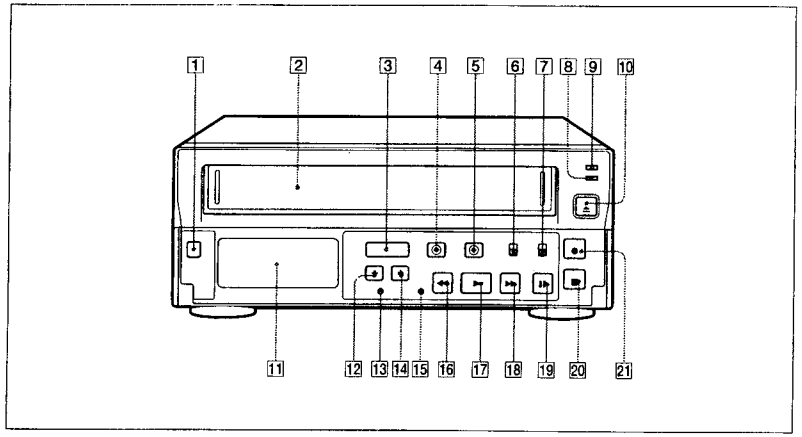
Clock operation backup
When a power interruption occurs, the built-in rechargeable battery will provide backup power for the clock for up to 30 days.

Security lock
To guard against operation errors, this VCR locks all of the buttons.

Monitoring the recording condition
You can check the recorded image during recording by pressing a single button.

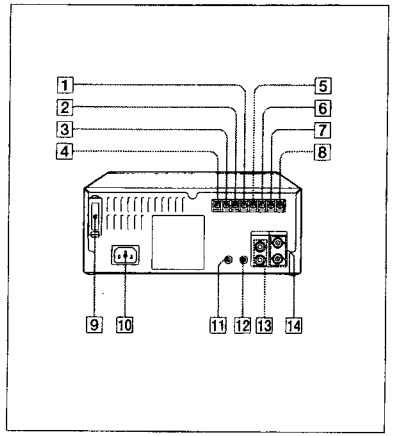
Location of Parts and Controls

Front Panel (Refer to pages in parentheses for details.)



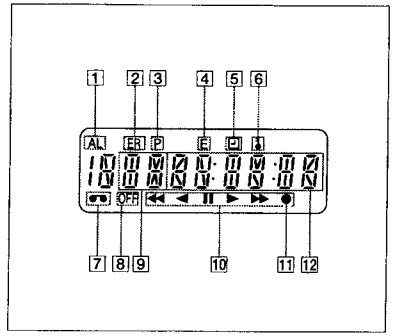
1 STANDBY/ON switch
2 Cassette compartment
3 MENU/AUDIO ON button (9/26)
4 TAPE SPEED/DATA ⊖ button (15/9)
5 TIMER REC/DATA ⊕ button (20/9)
6 ON-SCREEN ON/OFF switch (11)
7 REPEAT REC ON/OFF switch (16)
8 REPEAT REC indicator (16)
9 ON indicator
10 EJECT ⏏ button (14)
11 Display window (7)
12 SHIFT ♦/TRACKING – button (9/27)
13 ALL RESET button (30)
14 SHIFT ♦/TRACKING + button (10/27)
15 MENU RESET button (17, 22, 24)
16 REW ◀◀ button
17 PLAY ▶/REC CHECK button
18 FF ▶▶ button
19 PAUSE ❚❚/AL SCAN button
20 STOP ■ button
21 REC ● button

Rear Panel (Refer to pages in parentheses for details.)



1 TAPE END OUT terminal (30)
2 WARNING OUT terminal (30)
3 COM (common) terminal (30)
4 EXT TIMER IN terminal (21)
5 SW OUT terminal (31)
6 COM (common) terminal (23, 31)
7 ALARM OUT terminal (23)
8 ALARM IN terminal (23)
9 Battery compartment
10 AC IN (inlet) (8)
11 REMOTE jack (32)
12 MIC IN jack (8)
13 AUDIO IN/OUT jacks (phono type)
14 VIDEO IN/OUT jacks (BNC type) (8)

Display Window



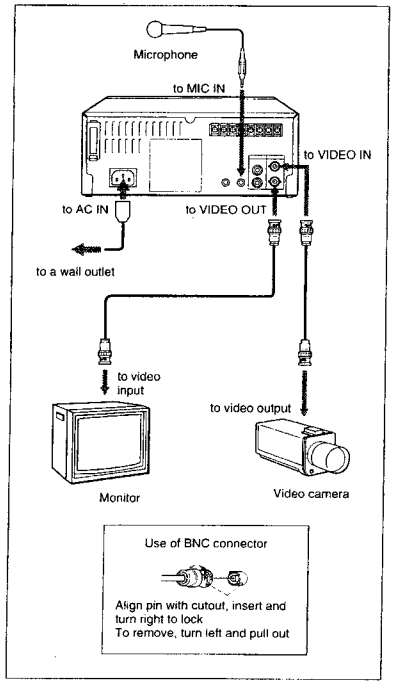
1 Alarm recording indicator
2 Error indicator
3 Power interruption indicator
4 External timer recording indicator
5 Timer recording indicator
6 Security lock indicator
7 Cassette indicator
8 OFF indicator
9 Tape speed indicator
10 Tape operation indicators
11 Recording indicator
12 Linear time counter/Timer recording indicator

Connections

Turn all the power off before making connections.
Connect the AC power cord last.

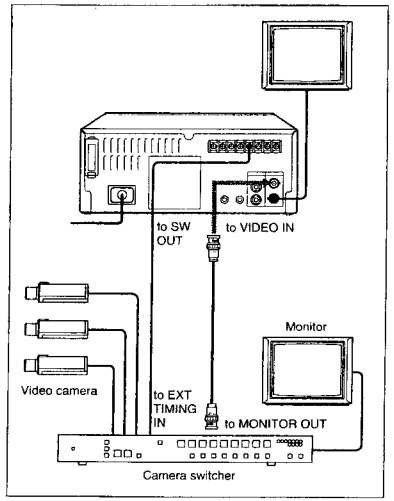
Connecting a Camera, Monitor and Microphone

With the following connections, you can monitor the picture and sound.



To connect an alarm sensor
Refer to page 23.

Connecting a Switcher

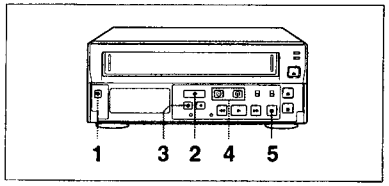


Note

When you connect several cameras to a switcher, synchronize the cameras.
If not, the picture will be disturbed.

Setting the Language

Select English, French or German for the display language.



1 Turn on the power.

2 Press MENU, and the SET UP 1 display appears on the monitor screen.

```
<SET UP 1>
*SUMMER TIME SET> NO USE
        WEEK MONTH TIME
 ON    LST-SUN  03 02 : 00
 OFF   LST-SUN  10 02 : 00

*CLOCK SET
 01-01-00 SAT  00 : 00 : 00

*LANGUAGE
   ENGLISH
```

3 Press SHIFT ↓ so that ENGLISH flashes.

```
*CLOCK SET
 01-01-00 SAT  00 : 00 : 00

*LANGUAGE
  ENGLISH
```

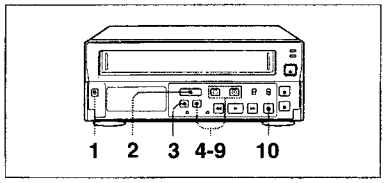
4 Press DATA ⊕/⊖ to select the language.

```
*CLOCK SET
 01-01-00 SAT  00 : 00 : 00

*LANGUAGE
  FRANCAIS
```

5 Press PAUSE to return to the normal display.

Setting the Clock

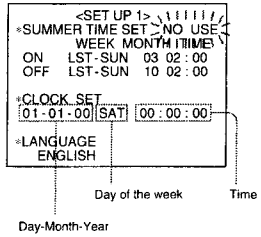
Set the clock to the current time and date on the monitor screen. For Daylight Saving Time, proceed the steps in "Adjusting to Daylight Saving Time" on page 11 first.



Example:
Set the date and time to 15:20 on 15 October, 1997.

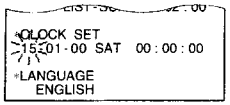
1 Turn on the power of the equipment to be used.

2 Press MENU, and the SET UP 1 display appears on the monitor screen.
The first display shows 1 January, 2000.

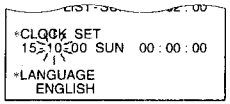


3 Press SHIFT ⬧ to move the flashing to 01.

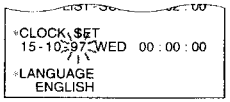
4 Set the day by pressing DATA ⊕/⊖, then press SHIFT ➧.



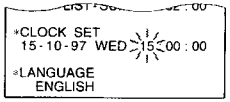
5 Set the month by pressing DATA ⊕/⊖, then press SHIFT ➧.



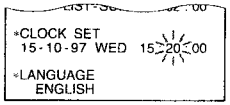
6 Set the year by pressing DATA ⊕/⊖, then press SHIFT ➧.



7 Set the hour by pressing DATA ⊕/⊖, then press SHIFT ➧.



8 Set the minutes by pressing DATA ⊕/⊖, then press SHIFT ➧.



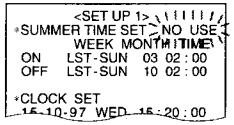
9 Press DATA ⊖ simultaneously with a time signal. You can set the clock at the 00 second point.

10 After setting the date and time, press PAUSE to return to the normal display.

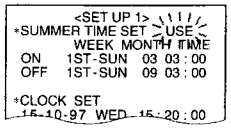
Adjusting to Summer Time

You can adjust to Summer Time when the season changes.

1 Press MENU, and the SET UP 1 display appears on the monitor screen.



2 Press DATA ⊕/⊖ to set SUMMER TIME to NO USE or USE:
NO USE: no Summer Time adjustment is made
USE: Summer Time adjustment is made



3 Set the date and time the Summer Time adjustment is made.
WEEK ON
Press DATA ⊕/⊖ to set which day the Summer Time adjustment is made:
1ST, 2ND, 3RD, 4TH or LST for first, second, third, fourth or last week.
Then press SHIFT ➧, and press DATA ⊕/⊖ to select the day of the week:
SUN, MON, TUE, WED, THU, FRI or SAT
MONTH ON
Press DATA ⊕/⊖ to set which month the Summer Time adjustment is made:
01, 02, 03, 04...1, 12 for January, February .....December
TIME ON
Press DATA ⊕/⊖ to set the time the Summer Time adjustment is made. The time can only be set between 01 and 22.
Then press SHIFT ➧, and press DATA ⊕/⊖ to set the minutes.

Following the same procedures as WEEK ON, MONTH ON and TIME ON, set **WEEK OFF**, **MONTH OFF** and **TIME OFF** when the time is changed back from the Summer Time to standard time.

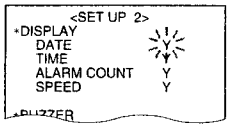
4 Press PAUSE to return to the normal display.

Setting the Time/Date Display

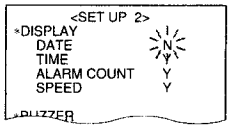
You can display four items of information, date, time, number of alarm recordings and recording/playback speed and turn off each item which you do not want to display.

1 Turn on the power of the equipment to be used.

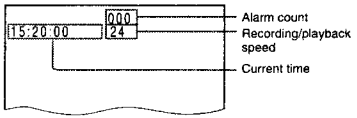
2 Press MENU until the SET UP 2 display appears on the monitor screen.



3 Press SHIFT ⬧ so that the item of DISPLAY to be set flashes and DATA ⊕/⊖ to set to Y(yes) or N(no)
Example: When you set the date display to N.



4 Press PAUSE to return to the normal display (time/date screen).



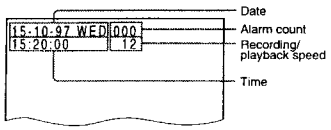
To turn off the screen display
Set the ON-SCREEN switch to OFF.

Setting the Clock

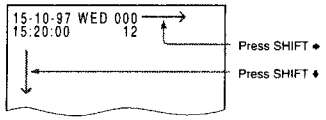
Changing the Display Position of the Time/Date Display

You can change the position of the time/date display that appears on the monitor screen.

1 Turn on the power of the equipment to be used. The normal display appears.



2 Change the display position as follows.
To move the display downwards, press SHIFT ↓. (When the display reaches the bottom of the screen, the display returns to the top of the screen.)
To move the display rightwards, press SHIFT →. (When the display reaches the right-hand edge of the screen, the display returns to the left-hand edge of the screen.)



Note

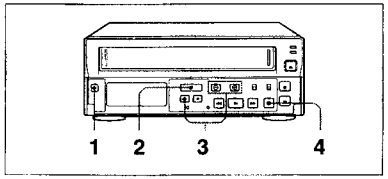
While recording, this function does not work.

To turn off or on the screen display

Set the ON SCREEN switch to OFF or ON.

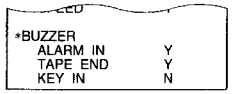
Setting the Buzzers

You can turn on/off three types of buzzers:
- **ALARM IN buzzer:** beeps while it receives an alarm signal. (See "Alarm Recording" for more information on page 23.)
- **TAPE END buzzer:** beeps when the tape reaches its end.
- **KEY IN buzzer:** beeps when you press a button.

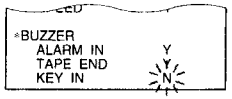


1 Turn on the power of the equipment to be used.

2 Press MENU until the SET UP 2 display appears on the monitor screen.



3 Press SHIFT ↓ so that the item of BUZZER to be set flashes and DATA ⊕/⊖ to set to Y (yes) or N (no).

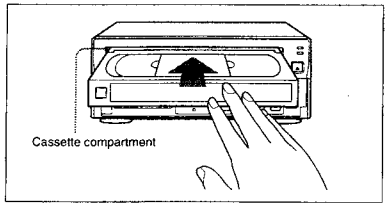


4 Press PAUSE to return to the normal display.

Handling a Video Cassette

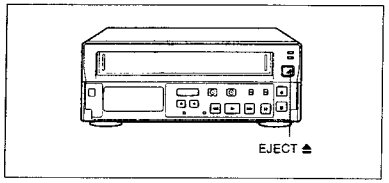
This section shows you how to insert a video cassette into the VCR.

Inserting a Video Cassette



Insert the cassette into the cassette compartment by slowly pressing its center with the arrow on the top.
When the cassette is inserted, the VCR automatically turns on and the ●● indicator lights in the display window.
If you insert the cassette without its safety tab for recording, the VCR ejects the cassette automatically.

Ejecting a Video Cassette



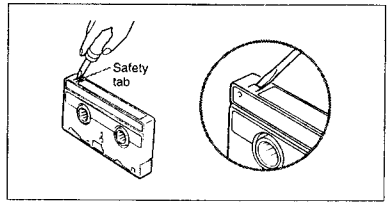
Press EJECT ≜ on the VCR.
You can eject the cassette even when the power is off.
When you press EJECT ≜, the VCR turns on automatically.
After ejecting the cassette, the VCR turns off again.

Recommended cassette

This VCR is designed and calibrated with 180-minute tape (Sony E-180). To ensure stable operation and optimum picture quality, we recommend that you use a Sony 180-minute tape.

Protecting Your Cassette from Being Erased

Remove the tab on the cassette with a screwdriver or a similar tool as shown below. This protects your cassette against an accidental recording.



If you want to record again on the cassette without its safety tab, simply cover the safety tab hole with a piece of plastic tape.

Setting the Operation Mode

You can set the mode for the VCR when a video cassette is inserted on the SET UP 3 display.

1 Press MENU until the SET UP 3 display appears on the screen.

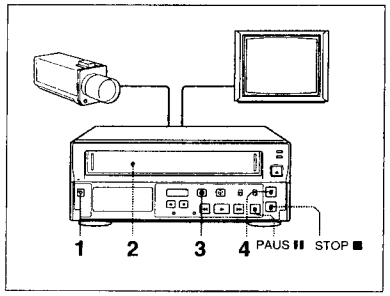
```
<SET UP 3>
ALARM MODE      Y1
ALARM SPEED     3H
ALARM DURATION  20S

TAPE IN MODE    STOP
TAPE END MODE   REW
TAPE END OUT    -3M
CLOG DETECT.    Y
```

2 Press SHIFT ↓ to move the flashing to TAPE IN MODE and set to STOP or REC by pressing DATA ⊕/⊖.
STOP: the VCR enters stop mode when a video cassette is inserted.
REC: the VCR enters recording mode when a video cassette is inserted.

3 Press PAUSE to return to the normal display.

Recording

This section shows you how to record the signal from the video camera in the normal or time lapse mode, to set the security lock and to record repeatedly on the same cassette.



1 Turn on the power of the equipment to be used.

2 Insert the cassette.

3 Set the recording speed by pressing TAPE SPEED.

Recording speed	Maximum recording time with 180-minute tape (hour)		Interval (sec.)	Audio recording	Tape motion
3	Standard mode	3	1/50	Possible	Continuous
12	Time lapse mode[a]	15	0.1		
24		27	0.18		

[a] In time lapse modes, it is possible to record additionally three hours longer than the displayed recording time.

In the display window

4 Press REC ●.
Recording starts.

To stop recording

Press STOP ■.

To pause recording

Press PAUSE ▮▮.
Press the button again to resume recording.

If recording does not start and the cassette is ejected

The tab on the cassette is removed to protect against accidental recording.

Notes

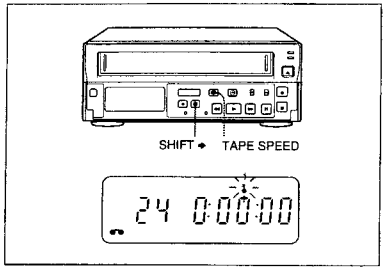
- Whenever you insert a tape and first start recording, Adaptive Picture Control (APC) automatically improves recording quality by adjusting the VCR to the condition of the video heads and tape. There is about a 6-seconds delay before the VCR actually starts recording when REC ● is pressed.
- This VCR is provided with a clog detection function. In time lapse modes, if recording is not made properly, the recording indicator will flash on the display window and a warning signal will be output from the WARNING OUT terminal. In this case, stop recording immediately and check the VCR.

Locking the Record Mode — Security Lock Function

Locking the record mode is useful to guard against accidental recording interruptions when the VCR is used for surveillance or monitoring purposes.

To set the security lock

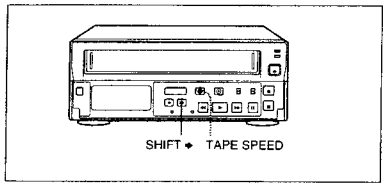
While pressing SHIFT ➧, press TAPE SPEED.
The 🔒 indicator lights in the display window.



The security lock function also works in timer recording mode.

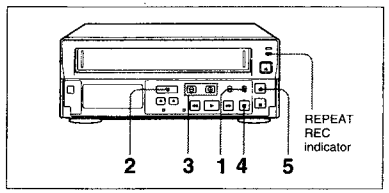
To release the security lock

While pressing SHIFT ➧, press TAPE SPEED again.
The 🔒 indicator turns off.



Recording on the Same Cassette Repeatedly — Repeat Recording

You can record on the same cassette repeatedly in two different modes: R (repeat) 1 and R (repeat) 2.



1 Set the REPEAT REC switch to ON.
The REPEAT REC indicator lights.

2 Press MENU until the SET UP 3 display appears on the screen.

```
<SET UP 3>
ALARM MODE      Y
ALARM SPEED     3H
ALARM DURATION  20S

TAPE IN MODE    STOP
TAPE END MODE   R1
TAPE END OUT    -3M
CLOG DETECT.    Y
```

3 Set the TAPE END MODE to R1 or R2 by pressing DATA ⊕/⊖.
R1: If an alarm input is received during repeat recording, the recording mode switches to alarm recording and the REPEAT REC indicator goes off. After the end of the tape is reached, the tape is automatically rewound and stops at the beginning. The OFF indicator lights in the display window.
R2: If an alarm input is received during repeat recording, the recording mode switches to alarm recording. Repeat recording is performed regardless of whether an alarm input is received or not.

4 Press PAUSE to return to the normal display.

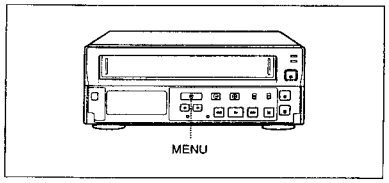
5 Press REC ●.
Recording begins.
When the tape reaches the end, the tape is rewound at the beginning and recording resumes.

Note
If REPEAT REC is set to OFF while repeat recording is in progress, recording proceeds until the end of the tape is reached and then stops automatically after the tape is rewound at the beginning. The OFF indicator lights in the display window.

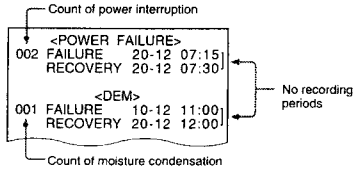
Recording after Power Interruption or Moisture Condensation

If a power interruption occurs, The P indicator lights in the display window and if a moisture condensation occurs, the "dddd" indicator flashes. Even if a power interruption or moisture condensation occurs while recording, the internal batteries provide backup power for memory for at least 30 days. The internal batteries can be charged in about 48 hours.
If the power is interrupted during recording, the recording starts automatically after power is restored.

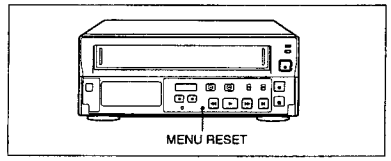
To check power interruptions or moisture condensation



Press MENU until the POWER FAILURE/DEW display appears.
This shows a count of the power interruption and moisture condensation and the period when the recording was interrupted.



To clear the P indicator



Press MENU RESET with pointed material.

To clear the power interruption/moisture condensation data

Press MENU until the POWER FAILURE/DEW display appears and press MENU RESET with pointed material.

Setting the Mode at the End of the Tape

You can set the mode of the tape operation when the tape comes to the end during recording using the SET UP 3 display.

When the REPEAT REC switch is set to OFF

1 Press MENU until the SET UP 3 display appears on the screen.

```
<SET UP 3>
ALARM MODE      Y
ALARM SPEED     3H
ALARM DURATION  20S

TAPE IN MODE    STOP
TAPE END MODE   REW
TAPE END OUT    -3M
CLOG DETECT.    Y
```

2 Set TAPE END MODE to REW, STOP or EJECT by pressing DATA ⊕/⊖.
REW: when the tape comes to the end, the VCR rewinds the tape automatically and enters stop mode at the beginning of the tape.
STOP: when the tape comes to the end, the VCR enters stop mode at once.
EJECT: when the tape comes to the end, the tape is ejected at once.

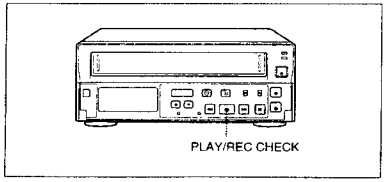
3 Press PAUSE to return to the normal display.

When the tape reaches the end
The OFF indicator lights in the display window. Press EJECT ⏏, REC ●, FF ▶▶, REW ◀◀ or PLAY ▶ to turn off the OFF indicator.

When the REPEAT REC switch is set to ON
Follows the steps 2 through 4 in "Recording on the Same Cassette Repeatedly — Repeat Recording" on page 16.

Monitoring the Recording Condition

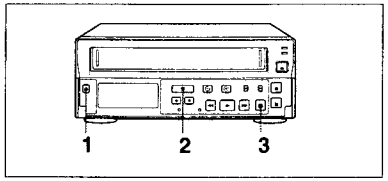
You can check the recording condition by pressing PLAY/REC CHECK while recording in time lapse mode.



Press PLAY/REC CHECK while recording.
After the tape is rewound for about three seconds and played back for about two seconds, the unit returns to the original recording mode.

Note
While monitoring the recording condition, recording is interrupted.

Checking the Used Time



1 Turn on the power of the equipment to be used.

2 Press MENU until the USED TIME display appears on the screen.
VIDEO: amount of time the video head has been used
POWER: the amount of time the power has been on.

```
<USED TIME>
VIDEO      00020H
POWER      00040H
```

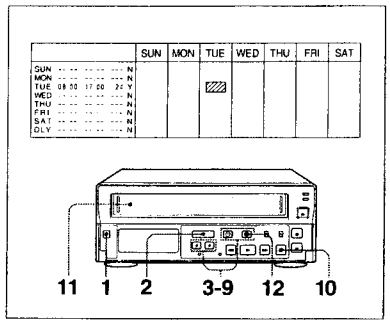
3 Press PAUSE to return to the normal display.

Timer Recording

You can set the timer recording in two methods: day of the week recording and daily recording.
Before starting, make sure that the time and date are set properly. (See page 10.)

Day of the Week Recording

Example:
Making a recording from 8:00 on Tuesday to 17:00 the same day with the recording speed set to 24-hour mode.



1 Turn on the power of the equipment to be used.

2 Press MENU until the TIMER SET display appears on the screen.

```
<TIMER SET>
WEEK START STOP  SPD
SUN  --:-- --:-- --- N
MON  --:-- --:-- --- N
TUE  --:-- --:-- --- N
WED  --:-- --:-- --- N
THU  --:-- --:-- --- N
FRI  --:-- --:-- --- N
SAT  --:-- --:-- --- N
DLY  --:-- --:-- --- N
EXT  ***** ***** --- N
```

3 Press SHIFT ↓ to move the flashing to TUE and the SHIFT → to move it to the hour position of START.

```
<TIMER SET>
WEEK START STOP  SPD
SUN  --:-- --:-- --- N
MON  --:-- --:-- --- N
TUE  --:-- --:-- --- N
WED  --:-- --:-- --- N
```

4 Set the start hour by pressing DATA ⊕/⊖ and press SHIFT →.

```
<TIMER SET>
WEEK START STOP  SPD
SUN  --:-- --:-- --- N
MON  --:-- --:-- --- N
TUE  08:-- --:-- --- N
WED  --:-- --:-- --- N
```

5 Set the start minute by pressing DATA ⊕/⊖ and press SHIFT →.

```
<TIMER SET>
WEEK START STOP  SPD
SUN  --:-- --:-- --- N
MON  --:-- --:-- --- N
TUE  08:00 --:-- --- N
WED  --:-- --:-- --- N
```

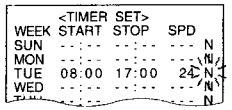
6 Set the stop hour by pressing DATA ⊕/⊖ and press SHIFT →.

```
<TIMER SET>
WEEK START STOP  SPD
SUN  --:-- --:-- --- N
MON  --:-- --:-- --- N
TUE  08:00 17:-- --- N
WED  --:-- --:-- --- N
```

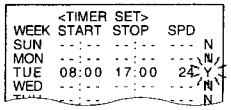
7 Set the stop minute by pressing DATA ⊕/⊖ and press SHIFT →.

```
<TIMER SET>
WEEK START STOP  SPD
SUN  --:-- --:-- --- N
MON  --:-- --:-- --- N
TUE  08:00 17:00 --- N
WED  --:-- --:-- --- N
```

8 Set the recording speed by pressing DATA ⊕/⊖ and press SHIFT ➡.



9 Select Y (yes) to execute the timer recording by pressing DATA ⊕/⊖.



If you want to preset other settings, repeat steps 3 to 9.

10 When you have completed all the settings, press PAUSE to return to the normal display.

11 Insert the cassette.

12 Press TIMER REC.
The VCR turns off automatically, and enters the timer recording standby mode. The ⏲ indicator appears in the display window.
When no cassette is inserted, the ⏲ indicator flashes and a beep sounds.

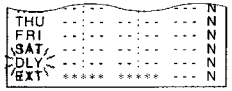
When the ⏲ indicator appears in the display window, the buttons except TIMER REC do not work.

Daily Recording

You can preset the timer to start recording each day of the week.

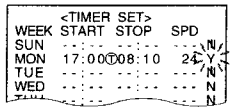
1 Move the flashing to the appropriate day of the week by pressing SHIFT ⬇.

2 Set the day to DLY by pressing DATA ⊕/⊖ before setting the hour position of START in step 3.



When the time set in the STOP section is earlier than the time set in the START section

The STOP time is assumed to be for the next day, and the T (tomorrow) indicator is displayed before the stop time.



Timer recording is interrupted when the power is interrupted

When a period of the power interruption is shorter than the power backup time (within 30 days) and within the timer end time, the recording is resumed after the power is restored.
The P indicator lights in the display window to show that the timer recording is interrupted.
To clear the P indicator, press MENU RESET on the front panel. (See page 17.)

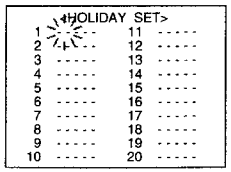
To stop the timer recording

Press TIMER REC. The recording stops.

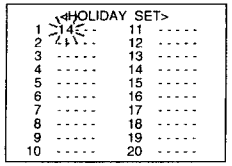
Setting the Holiday

If you enter dates for holidays, the VCR will assume that these dates are Sundays and will record at the same time you set for Sundays.

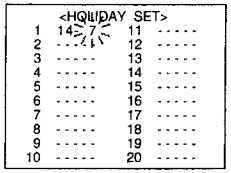
1 Press MENU until the HOLIDAY SET display appears on the screen.



2 Set the day of the holiday you want by pressing DATA ⊕/⊖ and press SHIFT ➡.



3 Set the month of the holiday by pressing DATA ⊕/⊖.



To set other holidays, press SHIFT ⬇➡ to move to the next row.

4 When you have completed all the settings, press PAUSE to return to the normal display.

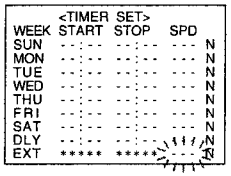
Recording Using an External Timer

You can preset the time to start and end recording by using a timer connected to the EXT TIMER IN terminal on the rear of the unit. Set the recording speed on the TIMER SET display on screen.

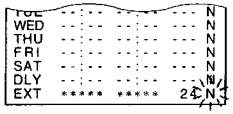
1 Turn on the power of the equipment to be used.

2 Press MENU until the TIMER SET display appears on the screen.

3 Press SHIFT ⬇ to move the flashing to EXT (lowest line) and press SHIFT ➡.



4 Set the recording speed by pressing DATA ⊕/⊖ and press SHIFT ➡.



5 Select Y (yes) to execute the timer recording by pressing DATA ⊕/⊖.

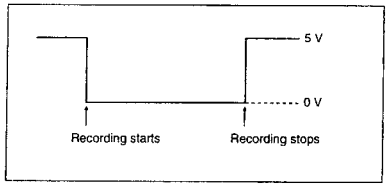
6 When you have completed all the settings, press PAUSE to return to the normal display.

7 Insert the cassette.

8 Press TIMER REC.
The VCR turns off automatically, and enters the timer recording standby mode. The ⏲ indicator appears in the display window.
When no cassette is inserted, the ⏲ indicator flashes and a beep sounds.

When the input signal from the EXT TIMER IN terminal becomes low, recording starts and the ⏲ indicator appears in the display window.
When the input signal from the EXT TIMER IN terminal becomes high, recording stops and the VCR enters the timer recording standby mode.

Input signal from the EXT TIMER IN terminal



Changing/Cancelling the Timer Settings

If the ⏲ indicator lights in the display window, press TIMER REC to clear it.

Changing the timer settings

1 Press MENU until the TIMER SET display appears on the screen.

2 Press SHIFT ➡ or ⬆ to move the flashing to the position where you want to change.

3 Press DATA ⊕/⊖ to change the setting.

4 Press PAUSE to return to the normal display.

Cancelling the timer setting

1 Press MENU until the TIMER SET display appears on the screen.

2 Press SHIFT ⬆ to move the flashing to the position where you want to cancel.

3 Press SHIFT ➡ to move the flashing to the timer execution.

4 Press DATA ⊕/⊖ to set the timer execution to N.

5 Press PAUSE to return to the normal display.

Cancelling all timer settings

1 Press MENU until the TIMER SET display appears on the screen.

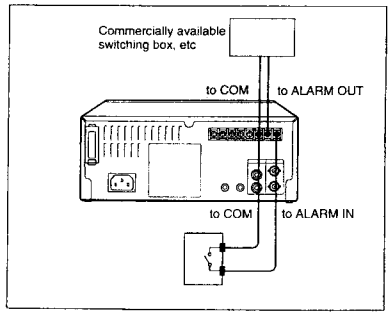
2 Press MENU RESET.
All timer settings are cleared.

3 Press PAUSE to return to the normal display.

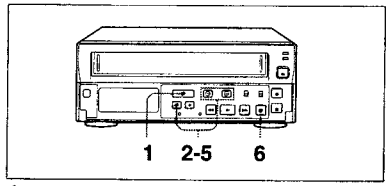
Alarm Recording

You can use a door switch or alarm sensor to trigger alarm recording. You can make alarm recording in recording mode, stop mode and power off mode with the selected recording speed.

Connecting an Alarm Sensor



Setting the Alarm Speed and Duration



1 Press MENU until the SET UP 3 display appears on the screen.

```
<SET UP 3>
ALARM MODE      Y1
ALARM SPEED     3H
ALARM DURATION  20S

TAPE IN MODE    STOP
TAPE END MODE   REW
TAPE END OUT    -3M
CLOG DETECT.    Y
```

2 Press SHIFT ⬆ to move the flashing to ALARM SPEED.

3 Set ALARM SPEED to 3H, 12H or NC by pressing DATA ⊕/⊖.
3H: for recording in 3-hour mode
12H: for recording in 12-hour mode
NC: for recording at the same speed as before the alarm was received.

4 Press SHIFT ⬆ to move the flashing to ALARM DURATION.

5 Set ALARM DURATION to 20S, 40S, 1M, 2M, 3M, 5M, CC or TRIG by pressing DATA ⊕/⊖.
20S/40S - 5M: for recording for 20 seconds, 40 seconds, 1 minute, 2 minutes, 3 minutes or 5 minutes
CC: for recording as long as the alarm signal is being input
TRIG: for recording from the alarm signal to the next alarm signal.

6 Press PAUSE to return to the normal display.

Alarm Recording

Setting the Alarm Recording Mode

1 Press MENU until the SET UP 3 display appears on the screen.

```
        <SET UP 3>
ALARM MODE      Y1
ALARM SPEED     SH
ALARM DURATION  20S

TAPE IN MODE    STOP
TAPE END MODE   REW
TAPE END OUT    -3M
CLOG DETECT.    Y
```

Y1 of ALARM MODE is flashing.

2 Set ALARM MODE to Y1, Y2, Y3 or N by pressing DATA ⊕/⊖.

Y1 (yes): always accepts alarms.

Y2: accepts alarms only when timer recording is proceeding.

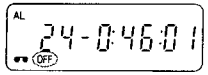
Y3: accepts alarms only in timer recording standby mode.

N (no): does not accept alarm even if an alarm signal is received.

3 Press PAUSE to return to the normal display.

Notes

- While alarm recording is in progress, other modes are inoperable.
- After the alarm recording is completed, the VCR returns to the condition it was in before the alarm signal was received.
- If an alarm input is received while the VCR is in repeat recording (see page 16), repeat recording stops and the REPEAT REC indicator goes off. After the tape reaches the end, the tape is rewound and the VCR stops. The OFF indicator lights in the display window.

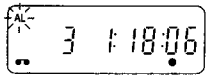


When the OFF indicator lights, in order to prevent accidental erasure of a recorded tape, timer recording and alarm recording cannot be executed.
If any of REC ●, FF ▶▶, REW ◀◀, PLAY ▶ is pressed, the OFF indicator goes off and operation for which you have press the button.

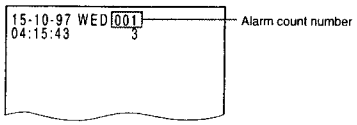
- If another alarm is received while alarm recording is in progress, the second alarm recording starts and the recording duration is extended.
- If the power is interrupted while alarm recording is in progress and restored again, the operation before the alarm recording was made resumes.

Indicators during alarm recording

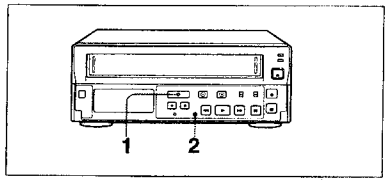
The AL indicator flashes in the display window.



The count (left digit) of the alarm recording flashes on the monitor screen.
The alarm recording can be counted up to 999.
When the alarm function has worked 1000 times, the count number returns to 000.



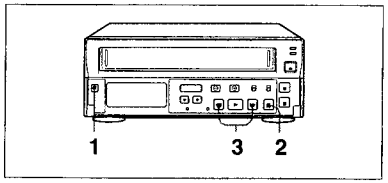
To Reset the Alarm Count



1 Press MENU until the ALARM TIME display appears ont he screen.

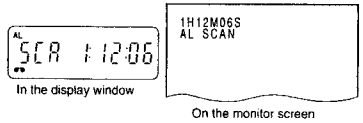
2 Press MENU RESET with a pointed material.

Scanning the Picture of the Alarm Recordings — Alarm Scan



1 Turn on the power of the equipment to be used.

2 Press PAUSE/AL SCAN in stop mode.
The SCA lights in the display window or AL SCAN on the monitor screen.



3 Press FF ▶▶ or REW ◀◀.
The portions where the alarm function worked are subsequently played back for five seconds one by one.

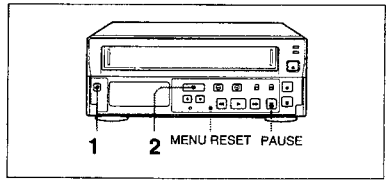
Press PAUSE ❚❚ to view a certain scene in still mode. (Alarm scan mode is released.)

Press STOP ■, PLAY ▶, FF ▶▶, or REW ◀◀ to release alarm scan mode.

Note

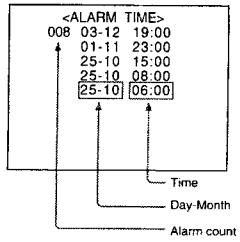
If the tape reaches the end during scanning, the tape is rewound and the unit enters the stop mode at the beginning of the tape.

Displaying the Alarm List — Alarm Recall



1 Turn on the power of the equipment to be used.

2 Press MENU until the ALARM TIME display appears on the screen.
The alarm count, date and time are displayed.
The date and time are displayed up to recent eight times.



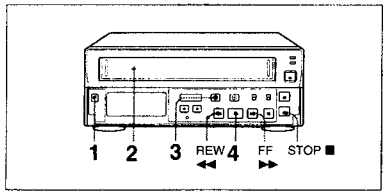
To turn off the alarm list on the screen

Press PAUSE. The normal display appears.

To reset the alarm data

Press MENU RESET while the ALARM TIME display is on the screen.
The alarm count shows "000".

Playback



1 Turn on the power of the equipment to be used.

2 Insert the cassette.

3 Select the playback speed by pressing TAPE SPEED.
The selected playback speed is displayed in the display window.

4 Press PLAY ▶.
Playback starts.

To stop playback
Press STOP ■.

To rewind the tape
Press STOP ■ and then REW ◀◀.

To fast-forward the tape
Press STOP ■ and then FF ▶▶.

Note

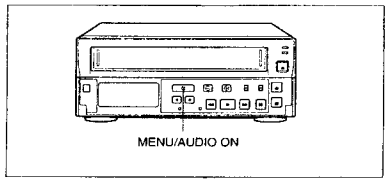
You may not play back the tapes recorded on other time-lapse VCR on this VCR and vice versa.

Audio Playback

You can play back the sound in 3-, 12-, or 24-hour mode.
Play back the tape at the same speed at which it was recorded so that you can monitor the sound normally.

For audio playback in 3-hour mode
Play back the tape normally.

For audio playback in 12-hour or 24-hour mode
Press MENU/AUDIO ON in playback mode.
"A12" or "A24" is displayed in the display window.
To turn off the sound, press MENUAUDIO ON again.



Note

Noise appears on the screen when you play back the sound in 12- or 24-hour mode.

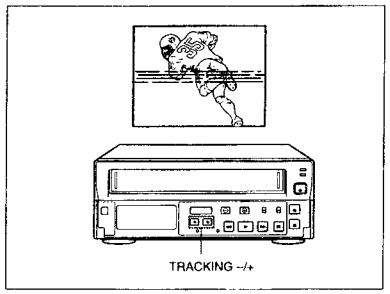
Playback speed
You can view the playback picture at one of the following speeds.

Recording speed(H)	Playback speed (H)		
	3	12	24
3	1	1/5	1/9
12	5	1	5/9
24	9	7/5	1

For example, when a tape recorded in 24-hour mode is played back in 3-hour mode, you can view the playback picture at a speed 9 times faster than the recorded one.

Adjusting Pictures

If streaks or noise bands appear on the playback picture, adjust the tracking condition.
Use TRACKING –/+.



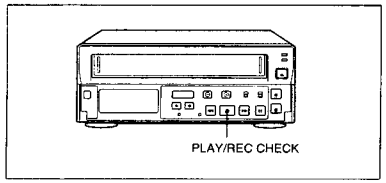
Recording

When the tape reaches the end
The OFF indicator lights in the display window. Press EJECT ⏏, REC ●, FF ▶▶, REW ◀◀ or PLAY ▶ to turn off the OFF indicator.

When the REPEAT REC switch is set to ON
Follows the steps 2 through 4 in "Recording on the Same Cassette Repeatedly — Repeat Recording" on page 16.

Monitoring the Recording Condition

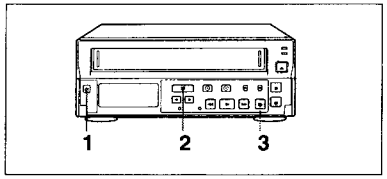
You can check the recording condition by pressing PLAY/REC CHECK while recording in time lapse mode.



Press PLAY/REC CHECK while recording.
After the tape is rewound for about three seconds and played back for about two seconds, the unit returns to the original recording mode.

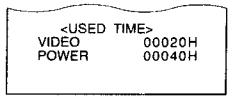
Note
While monitoring the recording condition, recording is interrupted.

Checking the Used Time



1 Turn on the power of the equipment to be used.

2 Press MENU until the USED TIME display appears on the screen.
VIDEO: amount of time the video head has been used
POWER: the amount of time the power has been on.



3 Press PAUSE to return to the normal display.

Maintenance

We recommend you check the VCR daily to confirm that the VCR works correctly.
When the security lock is in effect, release it before operating.

Perform the following checks before starting to record.

1 Turn on the camera, monitor, and this VCR.

2 Confirm that the picture from the camera appears on the monitor screen.

3 Confirm that the time and date display on the monitor is correct.

4 To check the recording condition of the previous day, rewind the tape for a few seconds and play back the tape.

5 Confirm that playback is normal.

6 Confirm that recorded time and date information is correct.

If you find any malfunction, switch all equipment off, unplug the VCR from the AC outlet, and consult your Sony dealer.

Cleaning Video Heads

After prolonged use, the video heads may become contaminated, which results in impaired picture quality (snow) or loss of picture. To avoid this, clean the video heads regularly.

Replacing Video Heads

If optimum picture quality is not restored even after you have cleaned the video heads, head replacement may be necessary. Please consult your Sony dealer.

Checking the Video Heads Every 1000 Hours

A VCR is a high-precision piece of equipment because it records or plays back the picture on a magnetic tape. In particular, the video head and other mechanical parts become dirty or worn. To maintain a clean picture, **we recommend maintenance every 1000 hours.**
To identify the service time, display the USED TIME screen. (See page 18.)

Maintaining Mechanical Parts

When not used for long periods, the VCR should be switched on now and then set to the playback mode for about three minutes. This helps to prevent mechanical deterioration.

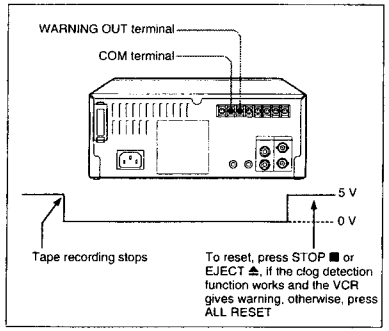
Servicing Periodically

To maintain optimum operating conditions and picture quality, periodic servicing (cleaning, lubrication, parts replacement) is necessary.
Please consult your Sony dealer.
If the VCR is to be used for critical monitoring purposes, it may be preferable to perform servicing at shorter intervals.

Terminals

WARNING OUT Terminal

This terminal will help you to know when something wrong has happened to the VCR during recording. The VCR outputs a signal from WARNING OUT terminal.

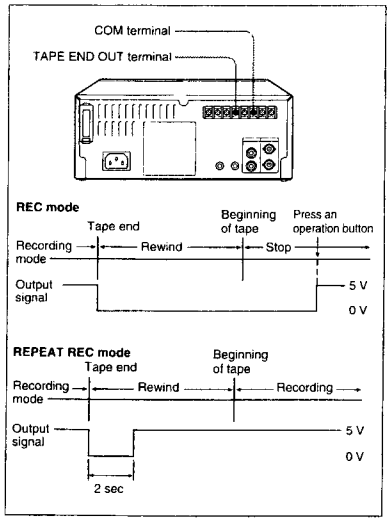

WARNING OUT terminal
COM terminal
5 V
0 V
Tape recording stops
To reset, press STOP ■ or EJECT ⏏, if the clog detection function works and the VCR gives warning, otherwise, press ALL RESET

Note

To turn the clog detection function off, set CLOG DETECT to N (no) on the SET UP 3 display.

TAPE END OUT Terminal

When the VCR detects the tape end during recording, the output level becomes 0 V DC. To resume the 5 V output, press the operation button (EJECT ⏏, REC ●, FF ▶▶, REW◀◀ or PLAY ▶, etc.).



Set TAPE END OUT to –3M or END on the SET UP 3 display.

- **–3M:** the time counter shows "2H57M" (about three minutes before the tape end, when using E-180 tape) and a signal is output from the TAPE END OUT terminal (recording will be continued to the end of the tape).
- **END:** the VCR detects the tape end.

1 Press MENU until the SET UP 3 display appears on the screen.

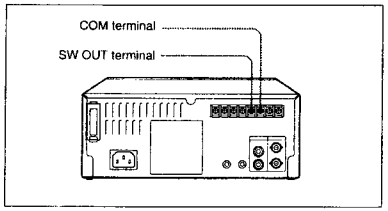
```
<SET UP 3>
ALARM MODE      Y
ALARM SPEED     3H
ALARM DURATION  20S

TAPE IN MODE    STOP
TAPE END MODE   REW
TAPE END OUT    -3M
CLOG DETECT.    Y
```

2 Press SHIFT ↓ to move the flashing to TAPE END OUT and set to –3M or END by pressing DATA ⊕/⊖.

3 Press PAUSE to return to the normal display.

SW OUT Terminal

The VCR outputs a pulse signal from the SW (switch) OUT terminal to the camera switcher to control the switching from camera to camera.



Specify the interval between each pulse signal on the SET UP 4 display. Also, set TIMING to FIELD or FRAME depending on the specifications of the camera switcher.

Available settings are:

FIELD: 1, 2, 3, 4, 5, 10, 30, or 60 fields

FRAME: 1, 2, 3, 4, 5, 10, 30, or 60 frames

1 Press MENU until the SET UP 4 display appears on the screen.

```
<SET UP 4>
*SW OUT      01
 FIELD       FIELD
 TIMING
 3H          Y
```

01 of FIELD is flashing.

2 Set the interval by pressing DATA ⊕/⊖ and press SHIFT ↠.

```
<SET UP 4>
*SW OUT      04
 FIELD       FIELD
 TIMING
 3H          Y
```

3 Set TIMING to FIELD or FRAME by pressing DATA ⊕/⊖.

```
<SET UP 4>
*SW OUT
 FRAME       04
 TIMING      FRAME
 3H          Y
```

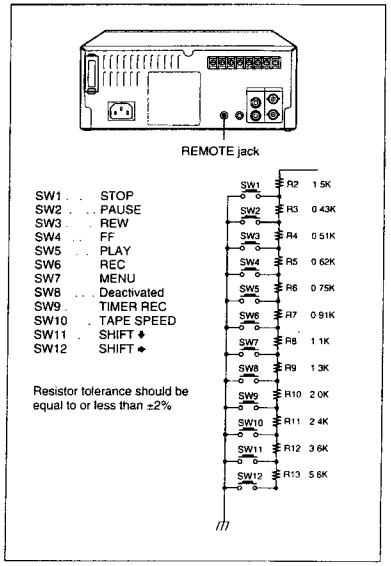
4 Set 3H (3-hour mode) to Y (yes) or N (no) by pressing DATA ⊕/⊖.
Y (yes): a signal is output in the 3-hour mode
N (no): a signal is not output in the 3-hour mode

5 When you have completed the settings, press PAUSE to return to the normal display.

Terminals

REMOTE Jack

The VCR can be remotely controlled by adding the circuit shown below to the REMOTE jack or by using the SVT-RM10 Remote Control Unit (not supplied).

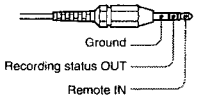


Note

Use a shielded cord less than 5 m (16 ft.) in length.

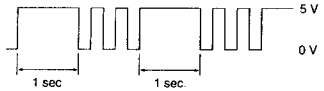
Using Recording Status Output Signal

Use a stereo mini plug to output the recording status signal from the REMOTE jack. The pin allocation of the Remote IN and Recording status OUT is as shown.



The recording status output signal functions as follows:

- When recording: 5 V signal is output.
- During recording pause: the signal slowly turns on and off repeatedly (about 1 Hz).
- If something is wrong with recording: the signal rapidly turns on and off repeatedly (about 4 Hz).
- At the end of the tape: the signal lights for about one second first then turns on and off rapidly twice (equivalent to 4 Hz).



Troubleshooting

This section may help you isolate the problem. Should the problem persist, unplug the unit and contact your Sony dealer or local authorized Sony service facility.

Symptom	Possible cause	Corrective action
The picture does not appear on the monitor screen.	Wrong connection.	Check the connection. (See page 8.)
	No power is provided to video camera and/or monitor TV.	Turn on the power.
The VCR does not respond when you press any button.	No cassette.	Insert a cassette.
	Moisture condensation has occurred.	Leave the VCR until its temperature reaches the room temperature. (See page 17.)
	The VCR is in the alarm recording.	Wait for the alarm recording to finish.
	The security lock function is working.	Release the security lock. (See page 16.)
	The VCR is in timer-recording standby mode or during timer recording.	Press TIMER REC to turn off the ⏲ indicator.
Recording cannot be done. (The tape ejects automatically.)	The safety tab on the cassette has been removed.	Cover the tab hole with plastic tape. (See page 14.)
Repeat recording cannot be done.	Alarm recording was made during repeat recording.	This is normal.
	REPEAT REC is set to OFF.	Set REPEAT REC to ON. (See page 16.)
Timer recording was not made.	Clock setting is not correct.	Set the clock correctly. (See page 10.)
	TIMER REC is not pressed.	Press TIMER REC. (See page 20.)
Playback picture flickers or blurs.	Video heads are dirty.	Clean the video heads.
Time and date were not recorded.	The time/date display is not displayed.	Set the time/date display. (See page 11.) Set ON-SCREEN to ON. (See page 11.)
The tape does not eject.	System trouble.	Press ALL RESET or unplug the VCR to reset the system.
The VCR does not function except to play back the tape.	The power of the equipment to be used is not turned on.	Turn on the power.
The ER (error) display appears in the display window.	There is a problem with your unit.	Please contact your Sony dealer.

Specifications

General

Recording method Dual-head rotating helical scanning system
Audio recording In 3-, 12- and 24-hour modes
Tape speed 23.39 mm/sec (3-hour mode)
Specified video cassette tape
VHS 1/2 inch video cassette tape
Recording/playback time
3, 12 and 24 (when using E-180 tape)
Fast-forward/rewind time
Approx. 2.5 minutes (when using E-180 tape)
Color system PAL color TV system

Video

Recording method Luminance signal: FM method
Color signal: Low-pass band-pass
Transformation direct recording method
Input BNC: 1 Vp-p, 75 ohms unbalanced
Output BNC: 1 Vp-p, 75 ohms unbalanced
S/N more than 44 dB
Horizontal resolution
Black & white mode: 350 lines
Color mode: 240 lines

Audio

Input 315 mV (–7.8 dBs), phono jack
47 kilohms unbalanced
Output 315 mV (–7.8 dBs), phono jack
600 ohms unbalanced
Microphone input –60 dBs,
ø3.5 mm minijack,
600 ohms
S/N 42 dB

Connector

Alarm input Low level
Alarm output +5 V, 5.7 kilohms (Low active)
Switch output +5 V, 5.7 kilohms (Low active)
Tape end output +5 V, 5.7 kilohms (Low active)
Warning output +5 V, 5.7 kilohms (Low active)
External timer input
Low level
Remote control input
ø3.5 mm stereo minijack

Other specifications

Operating temperature range
5°C to 40°C
Operating humidity range
80% or less
Power supply 220 - 240 V AC, 50 Hz
Power consumption
15 W
External dimensions
Approx. 240 × 96.5 × 333 mm (w/h/d)
(9 1/2 × 3 7/8 × 13 1/8 in.)
Mass Approx. 3.8 kg (8 lb 6 oz)

Supplied accessory

AC power cord (1)

Optional accessory

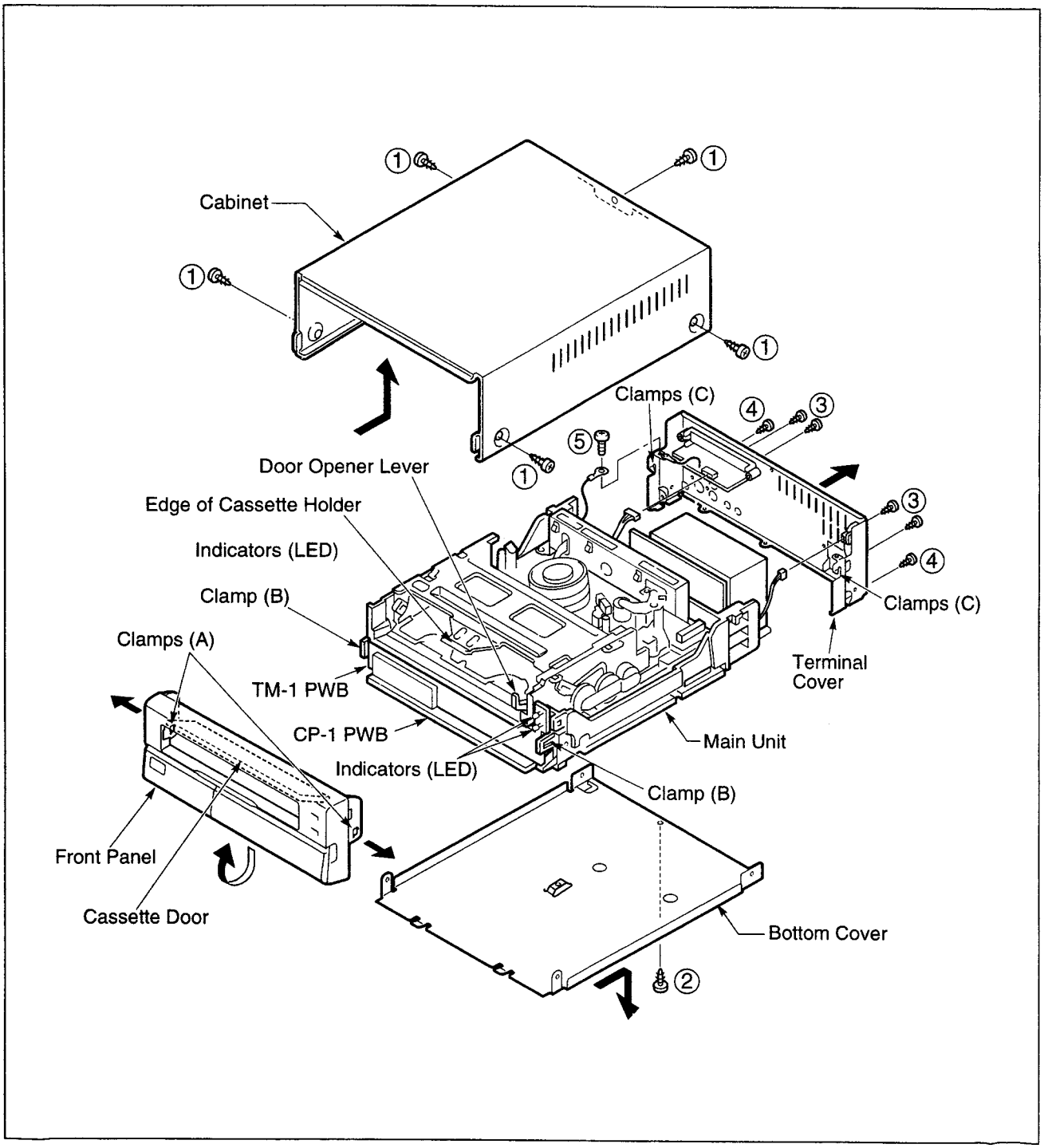
SVT-RM10 Remote Control Unit

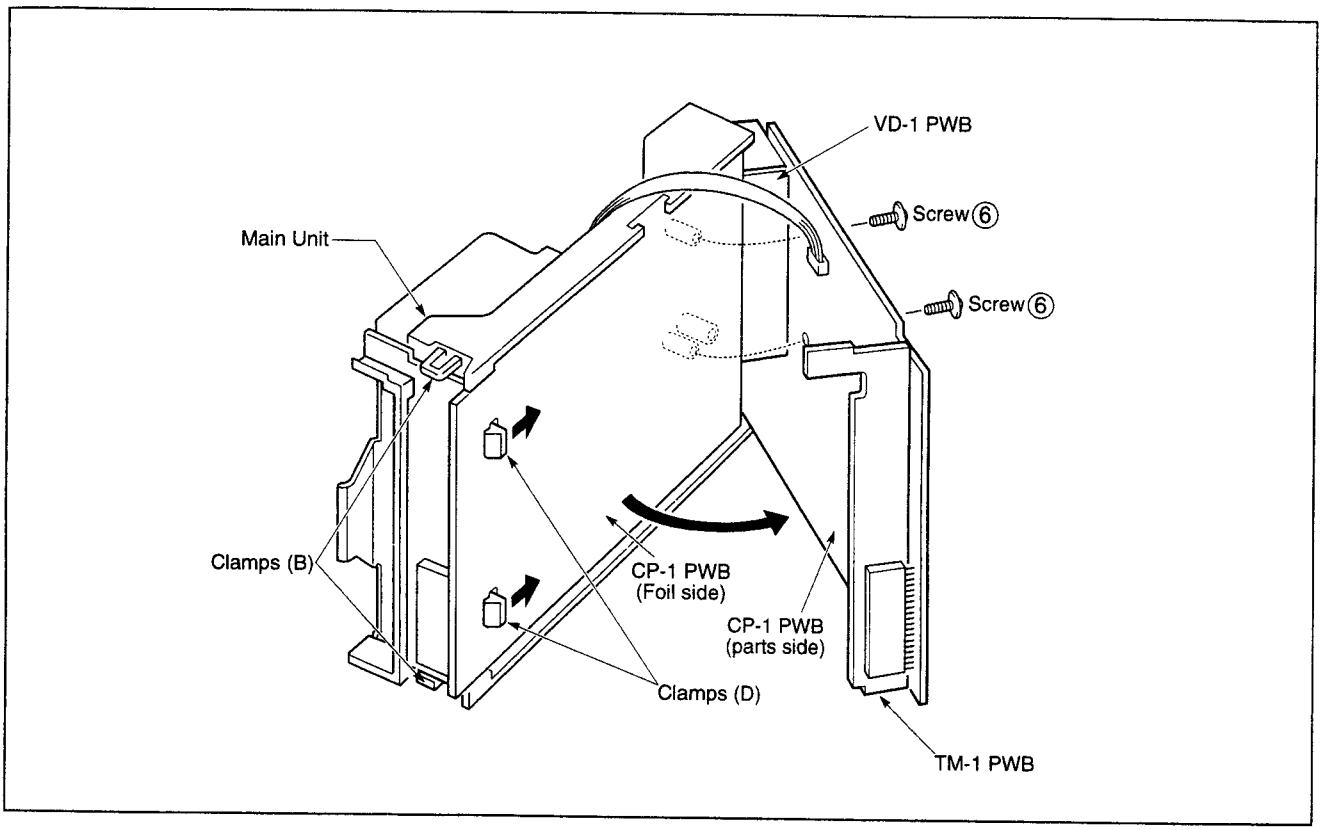
Design and specifications are subject to change without notice.

SECTION 2
SERVICE INFORMATION

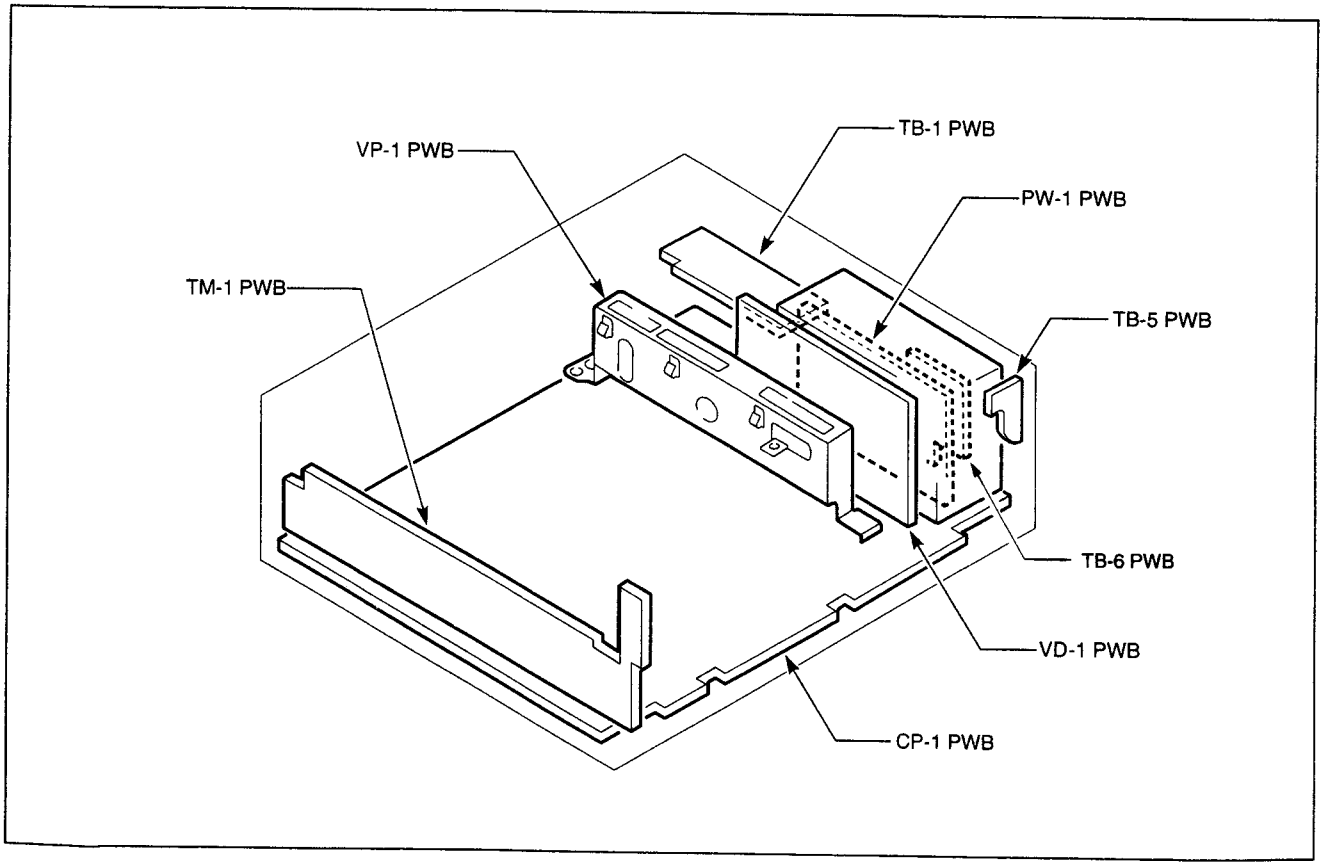
2-1. DISASSEMBLY

2-1-1. REMOVAL OF CABINET



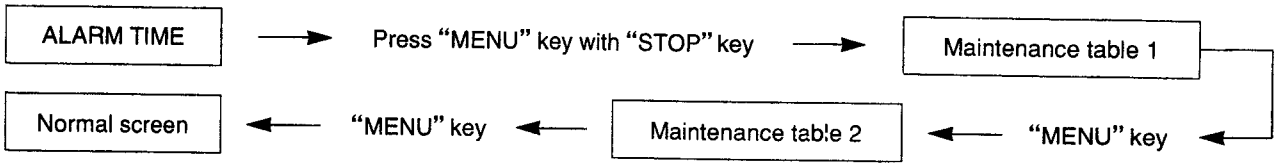


2-2. CIRCUIT BOARD LOCATIONS



2-3. MAINTENANCE TABLE ON THE MONITOR SCREEN

To display the maintenance table, press "MENU" key with "STOP" key while the fourth MENU〈ALARM TIME〉is isplayed.



Maintenance table 1

The used time of each mode (part) is displayed, and can be reset by items.
Access the maintenance-screen according to the above,and then Fig. below is displayed and HEAD TIME will blink.
Move the blinking to the item to be reset with "⬇" key and press the "MENU RESET" key, and then the used time for the item will be reset (00000H).

MAINTENANCE TABLE 1

〈USED TIME RESET〉

VIDEO	0 0 0 0 0 H
POWER	0 0 0 0 0 H
ALARM	0 0 0 0 0 0

VIDEO : Used time of the video head (cylinder) total hours of 〈MH-ON〉 (SSB BLK2 D4) = "L"
Note : Reset when the cylinder is replaced.

POWER : Hours of the power supply being ON 〈POWER ON〉 〈SSB BLK1 D7〉 = "L"

ALARM : Number of ALARM REC.
Total counts of ALARM.

Note : The data for the maintenance tables are memoried in E^2 PROM, and the memory can be kept if the timer microcomputer is reset.

Maintenance table 2

As shown in Fig.below Maintenance Table 2, 〈ERROR〉 is displayed on the screen.

MAINTENANCE TABLE 2

〈ERROR〉

1	3 1 − 1 2 − 9 7	E01	0 1
2	− − − − − − − −	− −	− −
3	− − − − − − − −	− −	− −
4	− − − − − − − −	− −	− −
5	− − − − − − − −	− −	− −
6	− − − − − − − −	− −	− −
7	− − − − − − − −	− −	− −
8	− − − − − − − −	− −	− −

When the "MENU RESET" key is pressed during display and resetting all data.

〈ERROR〉 : Dates and error codes are displayed when VCR happens to be in an abnormal condition and the system is down.
The newest data is displayed in the first line, and the old ones are moved down one by one. Not-displayed old data is cleared automatically.

Error Codes (Self-Diagnosis Contents)

E 01→ The cylinder motor does not rotate.
E 02→ The take-up reel does not rotate.
E 03→ The capstan motor does not rotate.
E 04→ The tape cannot be loaded with the cassette inserted.(But unloading can be performed.)
E 05→ The loading and unloading cannot be performed with the cassette inserted.
(The tape guide is caught.)
E 06→ Front unloading cannot be performed when ejecting the cassette.
(Front loading can be performed.)
E 07→ Front loading and front unloading cannot be performed when ejecting the cassette.
E 08→ The mechanism becomes 1(BRAKE) while moving from 2(STOP), 3(PLAY), 4(STILL/SLOW), and to 5 (REVERSE FRAME ADVANCE).
(The mechanism mode switch contact is faulty.)
E 09→ The mechanism becomes 7 (INITIAL) while moving from 1(BRAKE), 2(STOP), 3(PLAY), 4(STILL/SLOW),and to 5(REVERSE FRAME ADVANCE).
(The mechanism mode switch contact is faulty.)
E 10→ The capstan motor does not rotate or capstan motor and cylinder motor does not rotate by cassette in.
E 11→ The cylinder motor does not rotate by cassette in.

Mechanism Mode Display Contents

Mode No.	Mechanism Mode	Mode No.	Mechanism Mode	Mode No.	Mechanism Mode
00	CASSETTE OUT	09	REC	32	INTERMITTENT REC
01	STANDBY	12	CUE	33	REVERSE STILL
02	STOP	13	REVIEW		
03	STILL	14	FAST FORWARD		
04	REC-PAUSE	15	REWIND		
06	FRAME ADVANCE	30	REVERSE PLAY		
08	PLAY	31	REVERSE FRAME ADVANCE		

SECTION 3
MECHANICAL ADJUSTMENTS

1. MAINTAINING AND CHECKING THE MECHANISM

1-1. REGULAR CHECKS AND MAINTENANCE ITEMS

To obtain full function and maximum performance from the set, and to stop it getting dirty or scratched, we recommend that you carry out the following maintenance procedures and regular checks. The maintenance checks described in the following section should also be carried out without fail after carrying out any repairs to the set.

NOTE: OIL AND GREASE

- Always use the specified brands of oil and grease. If you use a grease with the wrong viscosity, for example, this can lead to all sorts of problems. Be careful to keep the oil and grease free of dust and foreign bodies.
- A "drop" of oil is the amount of oil remaining on the tip of a rod with a diameter of 1.5mm after it is dipped in oil to a depth of 1cm and then taken out.

1-1-1. REGULAR CHECKS

○Cleaning ◎Check △Oil □Check, Replace

Part maintained		Part Number	Hours of use (H)										Remarks
			500	1000	1500	2000	2500	3000	3500	4000	4500	5000	
Tape path system	Band brake assembly	3-963-789-01		◎				□				◎	
	BT lever assembly	3-961-016-01	○	○	○	○	○	○	○	○	○	○	
	Full erase head	3-193-669-01	○	○	○	○	○	□	○	○	○	○	
	Cleaner roller assembly	3-977-103-01		◎		◎		□		◎		◎□	
	Guide roller assembly	3-735-630-01	○	○	○	○	○	○	○	○	○	○	
	S incline mounting assembly	3-961-037-01	○	○	○	○	○	○	○	○	○	○	
	T incline mounting assembly	3-961-039-01	○	○	○	○	○	○	○	○	○	○	
	ACE head	A-8315-823-A	○	○	○	○	○	□	○	○	○	○	
	Pinch roller lever assembly	3-961-024-01	○	○	○	○	○	□	○	□	○	○	
	Pinch lift mounting	3-973-490-01										□	
	Pinch lift cam	3-961-027-01										□	
	Pinch cam gear	3-961-028-01										□	
	Cylinder earth assembly	3-970-879-01								□			
	Cylinder complete	A-8311-884-A	○	○	○	○	○	○	○	○	○	○(□)	
	Upper cylinder assembly	3-191-497-01	○	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	○(□)	
Reel drive system	Supply reel assembly	3-977-065-01		○		△□		○		△□		○	
	Take up reel assembly	3-963-782-01		○		△□		○		△□		○	
	S reel gear	3-960-927-01		△		△		△		△		△	
	T reel gear	3-960-928-01		△		△		△		△		△	
	Reel pulley	3-960-926-01		△		△		△		△		△	
	Special washer 2.4 x 6 x 0.25	3-948-603-01						◎				◎	
	Clutch mounting complete	A-8316-756-A		△		△		△		△		△	
	Reel belt	3-960-929-01				□				□			
	Capstan motor	1-698-579-11	○	○	○	○	○	○	○	○	○	□	
	Friction gear assembly	3-960-922-01				△				△□			
Brake system	S brake assembly	3-963-785-01		◎		◎		◎		◎		◎	
	T brake assembly	3-963-786-01		◎		◎		◎		◎		◎	
	Capstan brake assembly	A-8315-818-A		◎		◎		◎		◎		◎	
	T soft brake assembly	3-963-784-01		◎		◎		◎		◎		□	
Loading drive system	Loading motor assembly	3-961-047-01		◎		◎		◎		◎		□	
	Damper	3-961-049-01				◎						□	
	Worm gear complete	3-961-048-01				◎						□	
	Main cam	3-963-794-01				◎						□	
	Special washer 3.6 x 0.5	3-973-491-01				◎						□	
	Wheel gear 1	3-961-050-01				◎						□	
	Wheel gear 2	3-963-793-01				◎						□	
	Mode switch	3-963-780-01				◎						□	
	Crescent slide	3-963-795-01				◎						□	
	S load gear	3-960-995-01				◎						□	
	Front rack gear	3-961-305-01				◎						□	
	Rack gear	3-960-959-01				◎						□	
	Pinion gear	3-960-960-01				◎						□	
Perform-ance checks	Back tension torque			◎		◎		◎		◎		◎	PB back tension torque: 30-50g•cm
	FF, REW torque			◎		◎		◎		◎		◎	FF,REW: more than 600g•cm
	PLAY torque			◎		◎		◎		◎		◎	PLAY (8h): 55-110g•cm
	REV torque			◎		◎		◎		◎		◎	REV: 110-210g•cm

This periodic maintenance check table changes considerably according to the using conditions and environment.
Refer to POWER ON TIME, HEAD ON TIME for the length of time the unit has been used.
As life may be shortened if foreign particles and dusts remain accumulated on the tape guides and rotating and contacting portions, clean if dirty.
Dusts and other foreign particles on the tape guides may also shorten the tape life and lower picture quality, therefore clean thoroughly.

1-2. SERVICE TOOLS AND CLEANING

1-2-1. SERVICE TOOLS

NOTES ON ALIGNMENT TAPES

Select a PAL or NTSC alignment tape from the list below, according to the transmission system of the VCR you are repairing.

PAL: For models with 625 scanning lines and a field frequency of 50Hz

NTSC: For models with 525 scanning lines and a field frequency of 60Hz

No.	Tool	Tool No.	Remarks
1	Alignment tape MH-2 (VHJ-0008) Alignment tape PAL HiFi 400Hz (VHJ-0009)	H-7099-052-H H-7099-175-H	PAL NORMAL PAL MONOSCOPE
2	Eccentric screwdriver (VHJ-0003)	J-6082-044-A	Used to adjust the tape path
3	Nut box (VHJ-0048)	J-6082-045-A	Used to adjust the height of the lever load assembly
4	Torque gauge	H-7099-039-H	Used to measure reel winding torque
5	Torque gauge adapter	H-7099-035-H	
6	Cassette torque (VHJ-063S)	J-6082-011-A	Used to measure back tension torque
7	Load lever assembly height adjustment tool (VHJ-0111)	J-643-141-0A	Used to adjust the height of the load lever assembly
8	Torque gauge screwdriver (VHJ-0014)	J-6082-047-A	Used to adjust the tightening torque of screws
9	3 mm dia. bit for torque screwdriver (VHJ-0045)	J-6082-048-A	Used to replace the bit of the torque gauge screwdriver
10	Video head removing tool (VHJ-0041)	J-6082-049-A	Used to remove the upper cylinder
11	Oil (VHJ-0099)	7-661-018-18	————
12	Grease SGL-801 (VHJ-0100)	7-651-000-11	————
13	Grease EM-30LG (VHJ-0101)	J-6090-014-A	————
14	Relay cables (VHJ-0110)	J-643-142-0A	Relay cables of mechanism and CP-I PW8 assembly

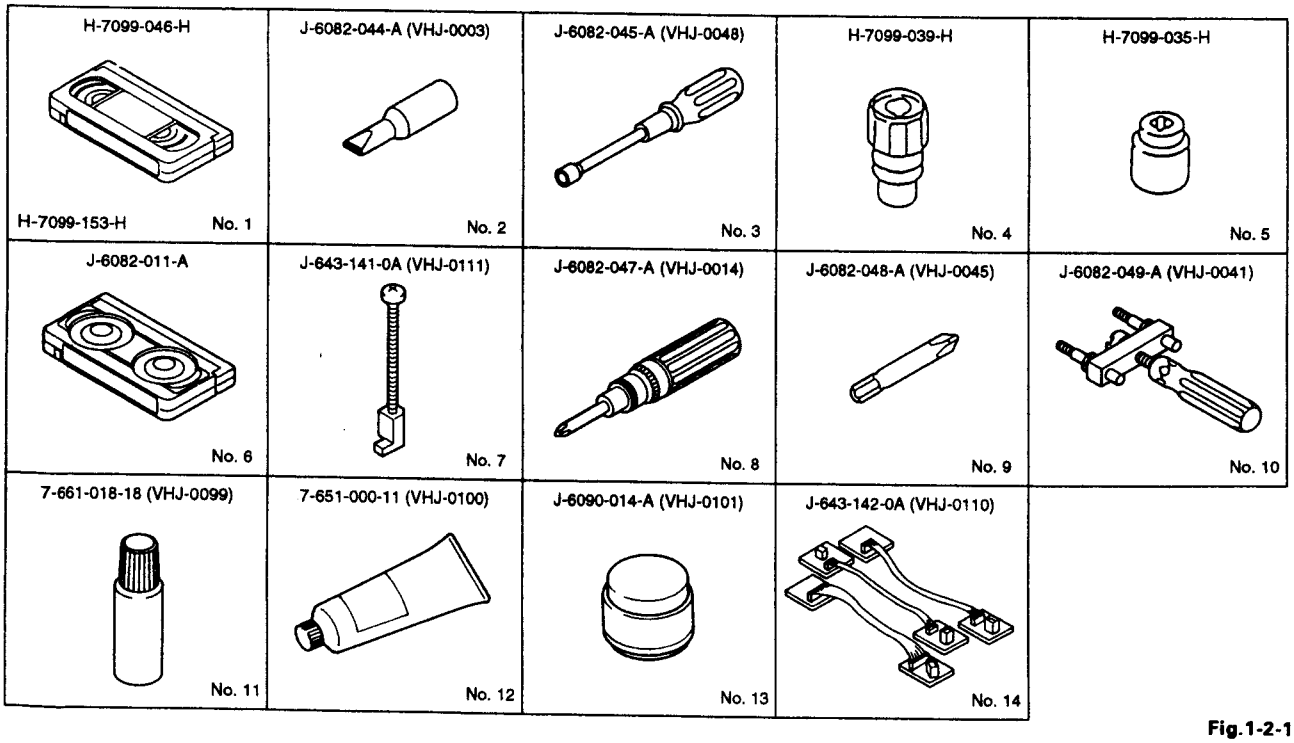


Fig.1-2-1

1-2-2. Using the Relay Cable (VHJ-0110)

The mechanism can be repaired without using the relay cable (VHJ-0110). As shown in Fig. 1-2-2, the relay cable (VHJ-0110) is a tool used for relay between the CP-1 PWB assembly and mechanism unit.
When connecting it, take note of the pin number of the connector.

NOTE 1: Do not place the mechanism upright as shown in Fig. 1-2-2 when inserting/ejecting the cassette.

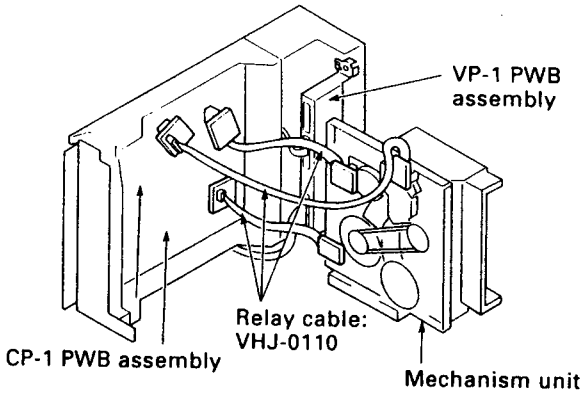


Fig. 1-2-2

1-2-3. CLEANING

1. Cylinder (Drum) (See Fig.1-2-3)

Moisten a chamois with methyl alcohol and clean the video head and the tape path surface of the cylinder. Be sure to wipe horizontally in relation to the video head. If you wipe vertically, or use excessive force, you can damage the video head.

2. Tape Path System / Reel Drive System

Clean the pinch roller, the capstan shaft, the tape guides, the FE head, the ACE head, the reel table, the pulley and the reel belt with a soft cloth, or chamois, moistened with methyl alcohol.

NOTE: If the dirt on the tape guide cannot be cleaned off, replace the tape guide.

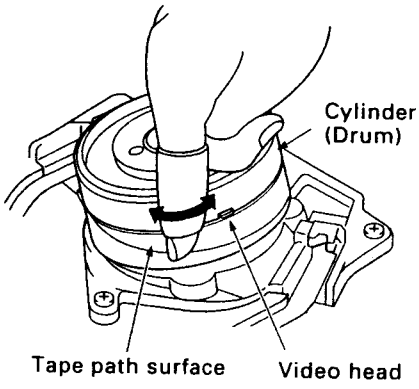


Fig.1-2-3

2. AN OVERVIEW OF THE MECHANISM

2-1. NAMES OF THE MAIN PARTS

2-1-1. CASSETTE MECHANISM ASSEMBLY

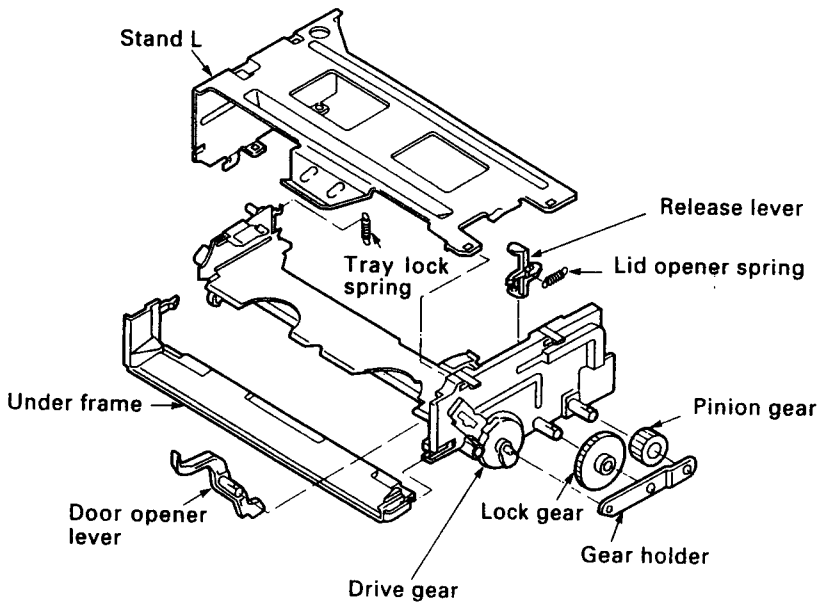


Fig. 2-1-1

2-1-2. TOPVIEW

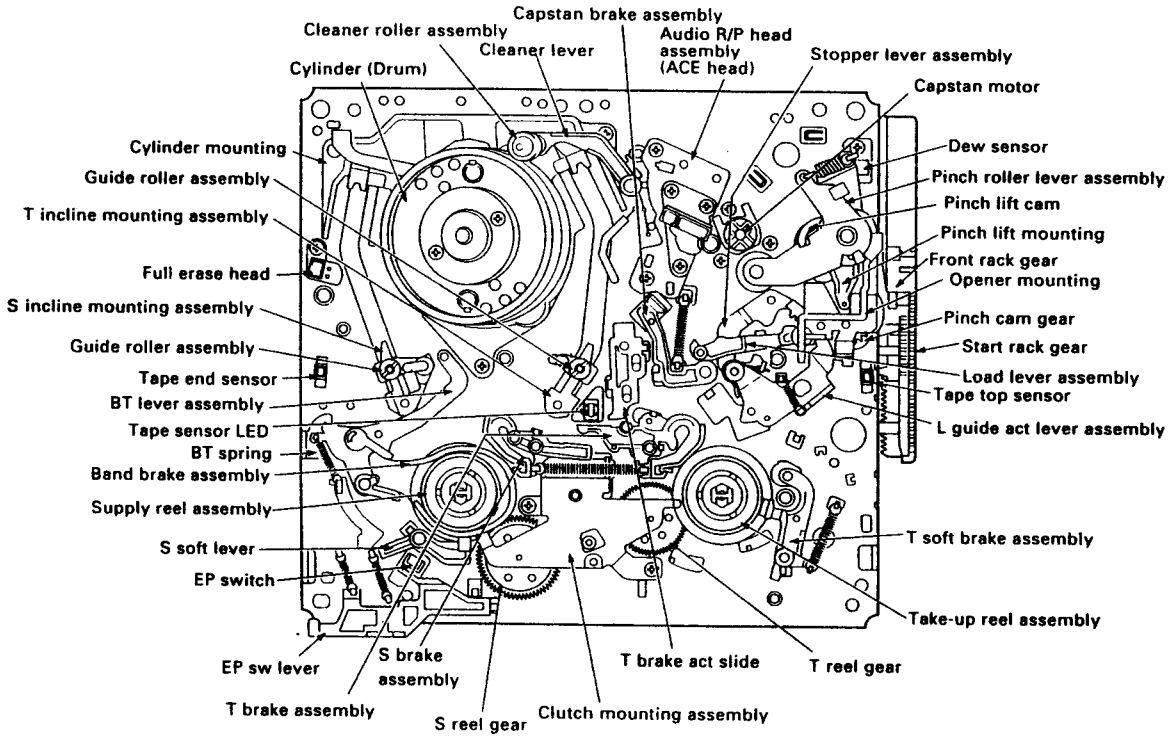


Fig. 2-1-2

2-1-3. UNDERSIDE

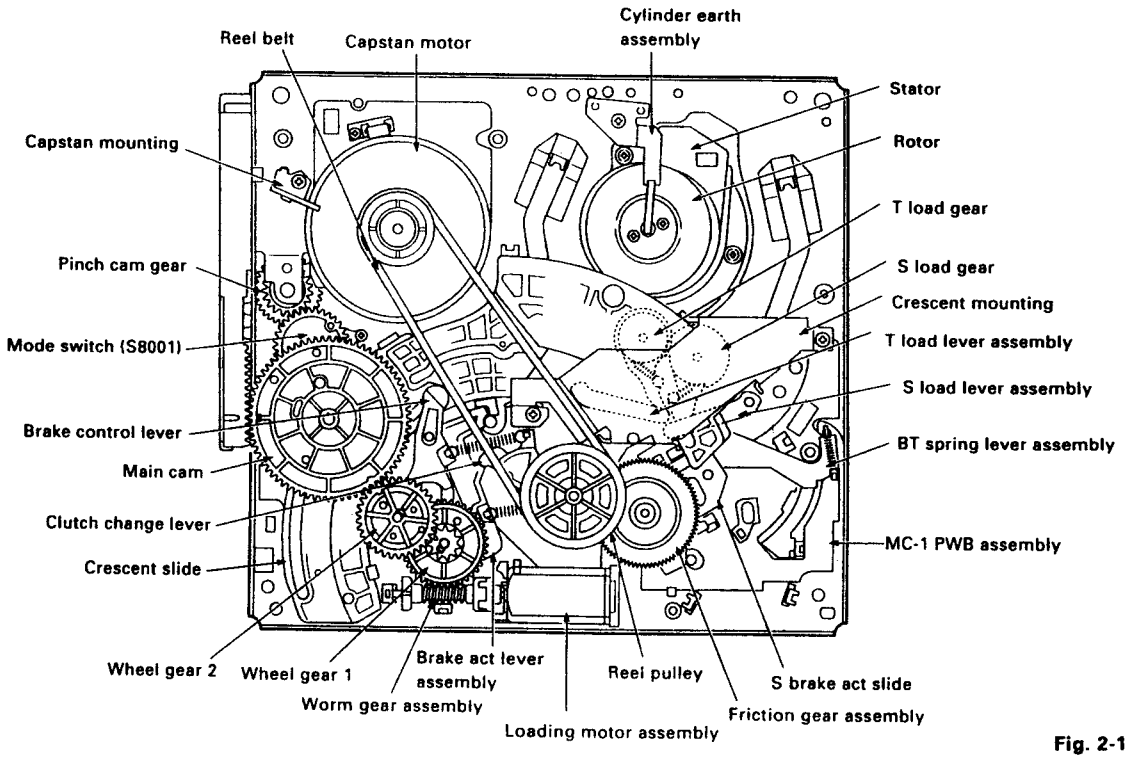


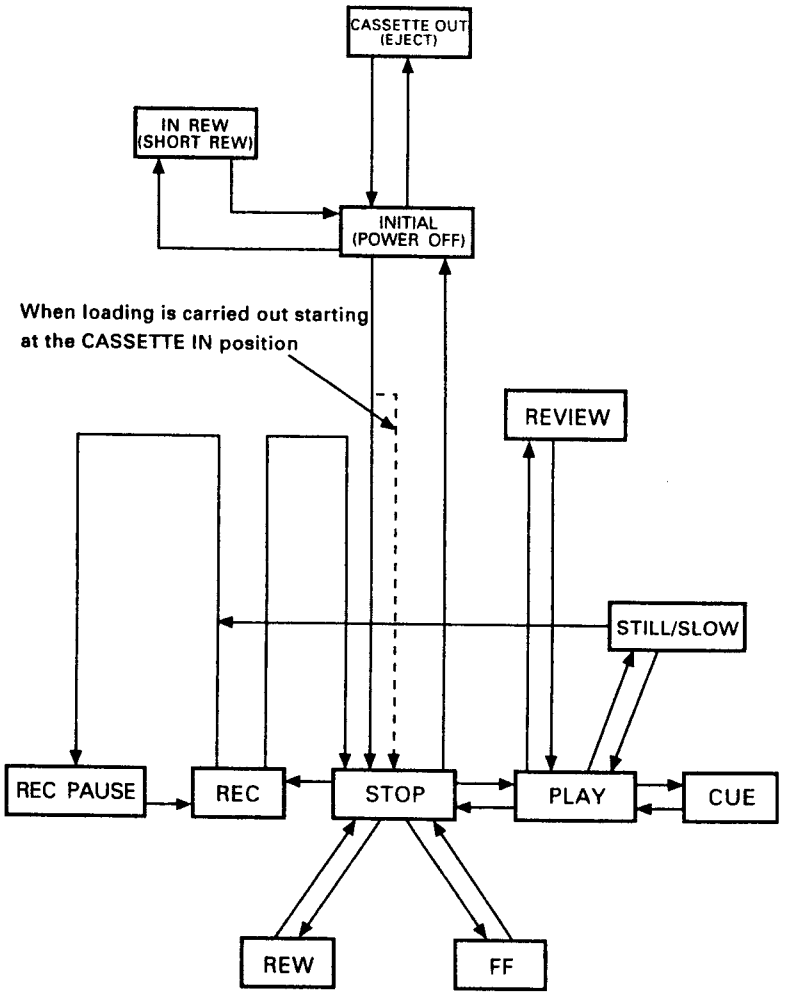
Fig. 2-1-3

2-2. AN OVERVIEW OF THE MECHANISM MODES

2-2-1. MECHANISM MODE SWITCHING TABLE

NOTE: The letters and figures enclosed in circles in the mechanism mode column are the codes on the crescent slide.

HEX DATA	Mechanism mode	The principal mode-switching states of the mechanism
6	⇐ EJECT Ⓔ Distinguished by whether the EP switch is ON or OFF. Horizontal shift section. Vertical shift section.	
2		
0	⇐ IN REW Ⓡ	
7	⇐ INITIAL ⑦	
0		
1	Cleaner roller assembly: ON S/T mounting incline assembly pressure begins.	
0	S/T mounting incline assembly pressure ends.	
1	⇐ REVIEW ①	
0		
2	IDLER pos. ② (Pinch roller OFF)	
0		
3	⇐ STILL/SLOW ③	
0		
5	⇐ PLAY/STOP ⑤	
0		
4	BRAKE pos. ④	
0		
6	⇐ FF/REW ⑥	



MODE SWITCH OUTPUT TABLE

HEX DATA	X	Y	Z
0	H	H	H
1	H	H	L
2	H	L	H
3	H	L	L
4	L	H	H
5	L	H	L
6	L	L	H
7	L	L	L

X: SW DATA 2
Y: SW DATA 1
Z: SW DATA 0

H: 5V
L: 0V
Low active

APPEARANCE OF MODE SWITCH AND RELATIONSHIP BETWEEN MODE POSITIONS

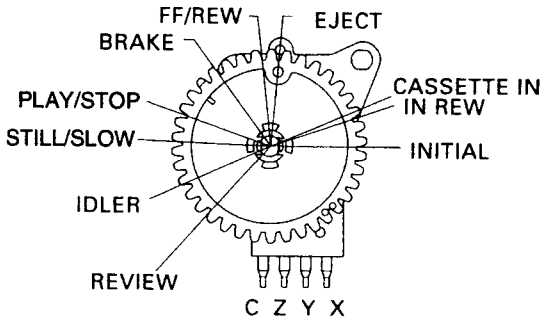


Fig.2-2-1

2-2-2. MOVEMENT CHECK LIST FOR THE MAIN PARTS OF THE MECHANISM

(S): Strength (W): Weakness

Mechanism mode / Principal parts	EJECT	IN REW	INITIAL (POWER OFF)	(LOADING)	(UNLOADING)	REV	IDLER	STILL/SLOW	PLAY/STOP	BRAKE	FF/REW	
T brake assembly	OFF	OFF	ON	ON	ON	OFF	OFF	OFF	OFF	ON	ON/OFF	
S brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	ON/OFF	
T soft brake assembly	OFF	OFF	OFF	ON	ON	ON	ON	OFF	OFF	OFF	OFF	
S soft lever	ON	ON	ON	ON	ON	OFF	OFF	OFF	OFF	OFF	OFF	
BT lever assembly	OFF	OFF	OFF	OFF	OFF	ON	ON	ON	ON	ON	ON	
BT spring	OFF	OFF	OFF	OFF	OFF	ON(W)	ON(W)	ON(S)	ON(S)	ON(S)	ON(W)	
Pinch roller lever assembly	UP	UP	UP	UP/DOWN	DOWN/UP	ON	OFF	ON	ON	OFF	OFF	
Clutch mounting assembly	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	PLAY	FF	
Load lever assembly	UNLO	UNLO	UNLO	LO	LO	LO	LO	LO	LO	LO	LO	
Capstan brake assembly	OFF	OFF	OFF	OFF	OFF	OFF	OFF	ON	OFF	OFF	OFF	
S and T incline mounting assembly				LO	UNLO							
Cleaner roller assembly	OFF	OFF	OFF	(ON)	(ON)	OFF	OFF	OFF	OFF	OFF	OFF	

2-2-3. HOW TO CHECK THE MECHANISM MODE POSITION

You can tell which mode the mechanism is currently in by looking at the codes and marking-lines on the crescent slide on the underside of the mechanism chassis. The edge of the crescent mounting is used as the reference line, as shown in Fig.2-2-2, and the marking-lines and symbols indicating the mechanism modes are displayed on the crescent slide, which slides against the edge of the crescent mounting. The mechanism mode is read off from the marking-line on the slide crescent which is aligned with the reference-line on the crescent mounting.
Example: In Fig.2-2-2, marking-line 6 is aligned with the reference-line on the crescent mounting, so the mechanism is seen to be in FF/REW mode.

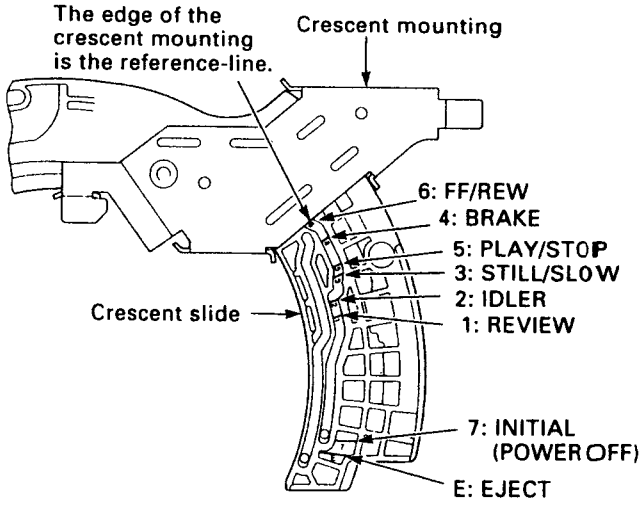


Fig.2-2-2

2-2-4. SELF-DIAGNOSIS DISPLAY

Some models are equipped with the SELF-DIAGNOSIS DISPLAYS function.
Use it as a means of finding out the symptoms and cause of the error before performing repairs.
For details, refer to the separate service manual for the respective models.

3. DISASSEMBLING THE MAIN PARTS OF THE MECHANISM

POINTS TO NOTE

- When fitting the parts of the mechanism, refer to the "Assembly Notes", and proceed in the reverse of dis-assembly order.
- Dis-assembly and assembly should be carried out in EJECT mode unless a movement mode is explicitly specified. EJECT mode is the state in which the cassette tape has been ejected.
- Clamps are used to prevent parts coming loose. When removing a clamp, be careful not to force it, as this can result in damage.

3-1. HOW TO MAKE THE MECHANISM MOVE

In order to check a movement such as front loading, front unloading, tape loading, tape unloading, raising/lowering and pressing the pinch roller, you will need to operate the loading motor. There are two methods of operating the loading motor, and these are explained in sections 3-1-1. The above movements can also be performed without operating the loading motor, by following the method explained in section 3-1-2.

3-1-1. OPERATING THE LOADING MOTOR BY THE MANUAL METHOD (See Fig.3-1-1)

1) Refer to section 3-2 and install the mechanism unit.
2) Using your finger, turn the loading motor located at the rear of the mechanism unit. For EJECT, turn the loading motor in the direction of the arrow on the loading motor. For PLAY or FF/REW, turn it in the opposite direction.
   When rotating the loading motor in the EJECT direction with a tape slacken, stop the rotation of the loading motor before beginning front unloading.
   Rotate the capstan motor with your hand, wind the slacked part of the tape, and rotate the loading motor in the EJECT direction again.
   When carrying out front loading, release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ of the cassette mechanism assembly (shown in Fig.3-2-2).

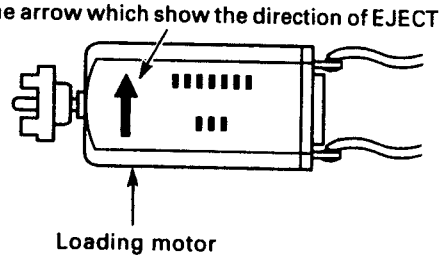


Fig.3-1-1

3-1-2. MAKING THE MECHANISM MOVE USING THE MANUAL METHOD

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) If you turn the main cam counterclockwise, the mechanism will switch to a mode such as PLAY or FF/REW. To switch from FF/REW mode to EJECT mode, turn the main cam clockwise.

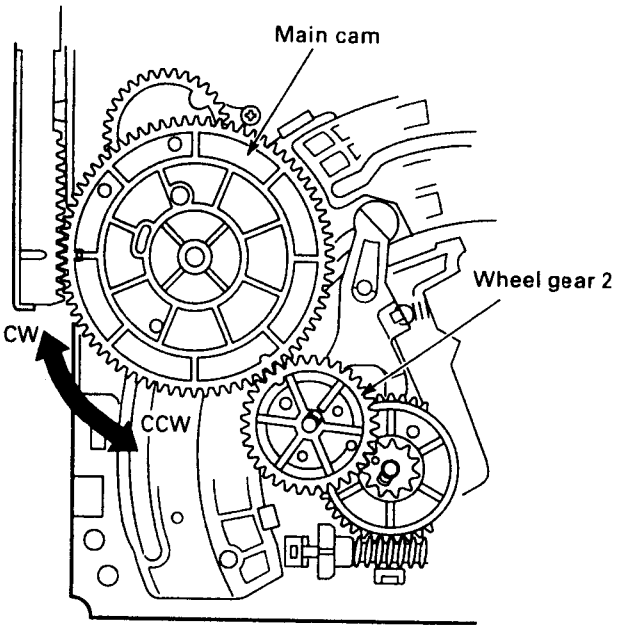


Fig.3-1-2

3-2. MECHANISM UNIT (See Figs. 3-2-1 and 3-2-2)

1) Remove the top cover, bottom cover and front cabinet assembly.
2) Unplug the flat cable ① from the VM-1/VP-1 PWB assembly on the cylinder (drum), and unplug the ACE head connector ②.
3) Unplug the dew sensor connector ⑩.
4) Remove the two screws ③, then remove the VM-1/VP-1 PWB assembly ④, lifting it upwards. The shape of the VM-1/VP-1 PWB assembly varies according to the model.
5) Remove the two screws ⑤ and the two screws ⑥, then lift up the mechanism unit. The tray ⑦ will stop you removing the two screws ⑤ on the front, so release the lock by pressing down the tray lock lever ⑧ and the lid opener lever ⑨ shown in Fig.3-2-2, then slide off the tray ⑦. Move the tray by referring to section 3-1 and turn the loading motor in the PLAY direction.

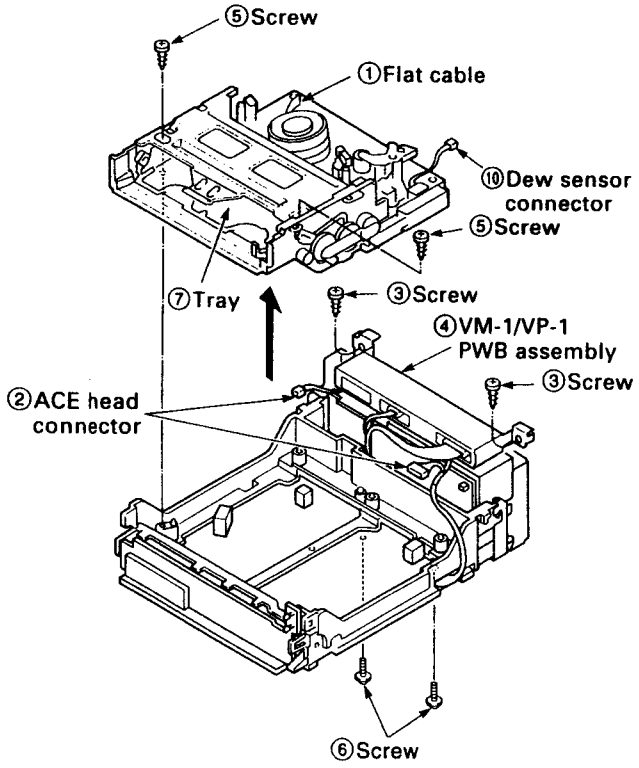


Fig.3-2-1

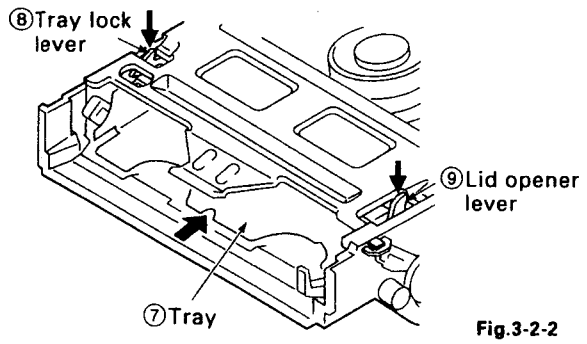


Fig.3-2-2

3-3. CASSETTE DRIVE MECHANISM

3-3-1. CASSETTE MECHANISM ASSEMBLY (See Figs.3-3-1 and 3-3-2)

1) Put the VCR into EJECT mode.
2) Remove the two screws ①.
3) Lift up the back of the cassette mechanism assembly ② slightly, and remove the two hooks ③ on the front.

ASSEMBLY NOTES:

1. The cassette mechanism assembly and the mechanism chassis should both be fitted in EJECT mode.
2. Check that the two hooks ③ have snapped into the mechanism chassis, and make sure that the two holes ④ in the cassette mechanism assembly are aligned with the two dowels ⑤ on the mechanism chassis.
3. Make sure that the big tooth on the pinion gear of the cassette mechanism assembly slots properly into the deepest gap in the start rack gear, as shown in Fig.3-3-2.
4. When fitting the two screws ①, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 5 kg/cm.

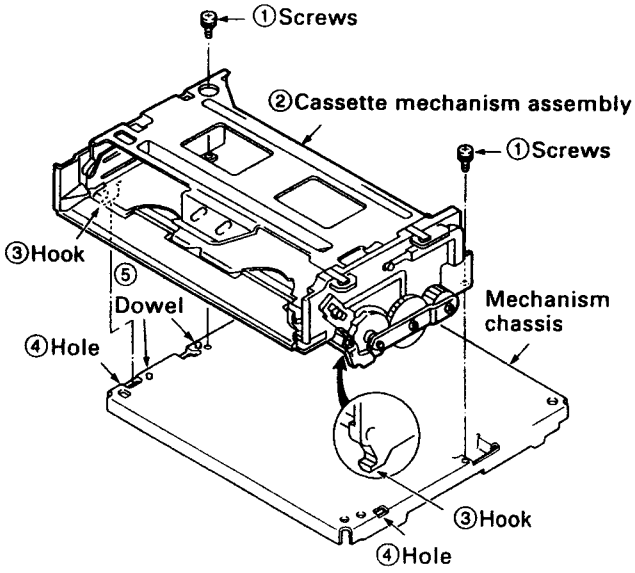


Fig.3-3-1

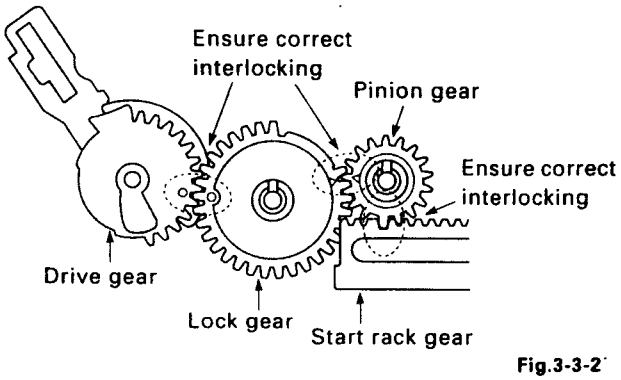


Fig.3-3-2

3-3-2. CASSETTE DRIVE GEAR (See Fig.3-3-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove clamps ① and ②, then remove the gear holder ③.
3) Remove the clamp ①, then remove the pinion gear ④.
4) Remove the clamp ②, then remove the lock gear ⑤.

ASSEMBLY NOTES:

1. Put the tray in the EJECT mode position before fitting any parts.
2. Apply grease (VHJ-0100) to the gear mounting shafts, all the gear teeth, and the cam part of the drive gear ⑥.
3. Ensure that the drive gear, the lock gear and the pinion gear interlock correctly, as shown in Fig.3-3-2.
4. Make sure the clamps ① and ② snap in to the gear holder ③.

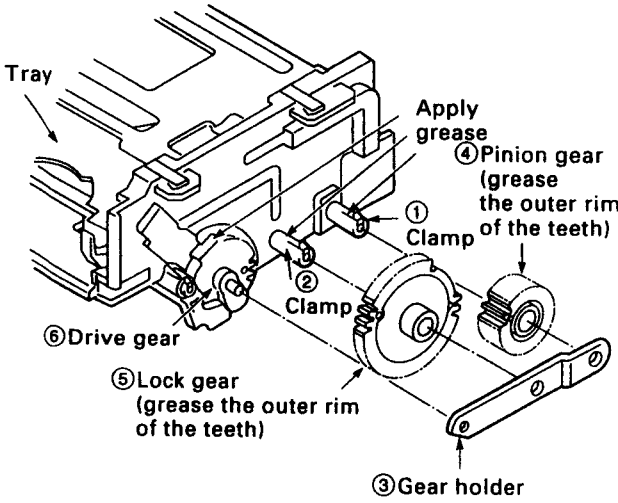


Fig.3-3-3

3-3-3.DOOR OPENER, UNDER FRAME AND STAND L (See Fig.3-3-4)

1) Remove the cassette mechanism assembly, referring to section 3-1.
2) Remove the two clamps ① and take out the under frame ②, pulling it towards you.
3) Press down the tray lock lever ③ and the lid opener lever ④, and loosen the tray ⑤, lifting it away from you. In this state, press the clamp ⑥ and remove the door opener lever ⑦.
4) Remove the two clamps ⑧ and take out the stand L ⑨. Be careful not to exert too much force on the clamps ⑧, as this could cause damage.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the grooves ⑪ on the stand L, the inside of the hole ⑬ in the drive shaft ⑫, and the mounting hole ⑭ in the door opener lever of the stand R.
2. Before fitting the stand L ⑨, be sure to move the tray ⑤ back as far as the EJECT mode position. Put the two pins ⑩ on the tray ⑤ into the grooves ⑪ on the stand L. Put the drive shaft ⑫ into the hole ⑬.
3. Be sure to fasten the two clamps ① and the clamp ⑥ on the stand R, and to fasten the two clamps ⑧ on the stand L.

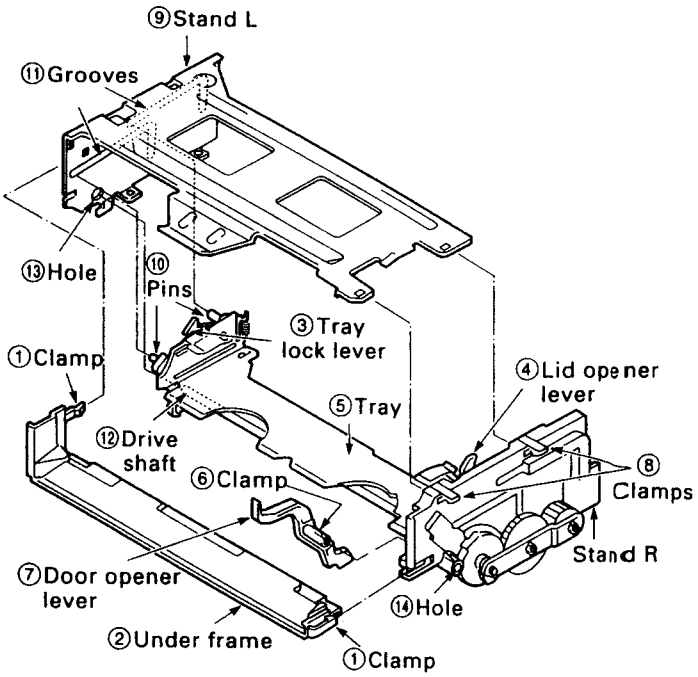


Fig.3-3-4

3-3-4.START RACK GEAR AND FRONT RACK GEAR (See Figs.3-3-5 and 3-3-6)

1) Remove the mechanism unit, referring to section 3-2.
2) Remove the cassette mechanism assembly, referring to section 3-3-1.
3) Remove the special screw ①. When you do this, slide the front rack gear assembly ② towards the front until it stops, then take it off the shaft ③. Take care not to damage the shaft ③.
4) Remove the spring ④.
5) Remove the clamp ⑥ on the front rack gear ⑤, then remove the start rack gear ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the front rack gear ⑤ and all over the inside of the groove on the start rack gear ⑦.
2. Align the positioning mark ⑧ on the front rack gear ⑤ with the mark ⑩ on the main cam ⑨.
3. When installing the cassette mechanism assembly, refer to section 3-3-1 and align the start rack gear with the pinion gear.

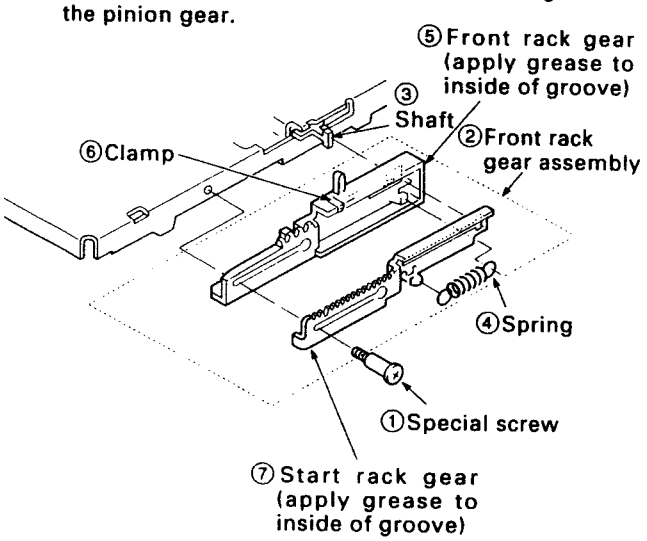


Fig.3-3-5

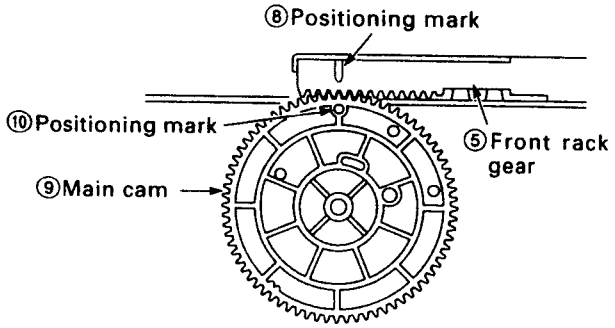


Fig.3-3-6

3-4. CLEANER ROLLER ASSEMBLY (See Fig.3-4-1)

1) Remove the clamp ① and take out the cleaner lever ②. When you do this, be careful not to bend the plastic springs Ⓐ and Ⓑon the cleaner lever ②.
2) Remove the clamp ③, and take out the cleaner roller assembly ④. Be careful not to touch the sponge on the cleaner roller assembly ④.

ASSEMBLY NOTES:

1. When mounting the cleaner lever ② on the shaft ⑤, press the clamp ① in the direction shown by the arrow, and snap it into the mounting ⑥ on the audio R/P head assembly.

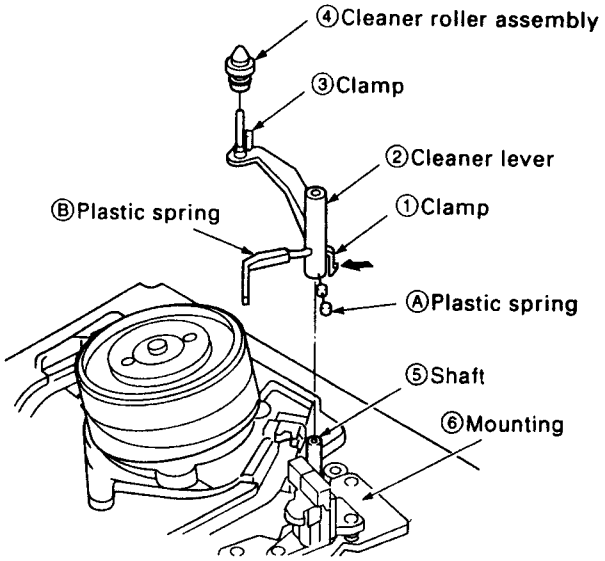


Fig.3-4-1

3-5. CYLINDER (DRUM)

3-5-1. UPPER CYLINDER ASSEMBLY (UPPER DRUM) (See Figs. 3-5-1, 3-5-2, 3-5-3,3-5-4)

1) Remove the two screws ① (See Fig.3-5-1).
2) First, tighten the handle ② of the video head removing tool (VHJ-0041), then screw the two long screws ③ evenly into the two screw holes ⑤ in the upper cylinder assembly (upper drum) ④ (See Fig. 3-5-2).
3) Hold the tool (VHJ-0041) so that the upper cylinder assembly (upper drum) ④ does not rotate, and at the same time, turn the handle ② clockwise, and remove the upper cylinder assembly (upper drum) ④.
4) Remove the tool (VHJ-0041) from the upper cylinder assembly ④.

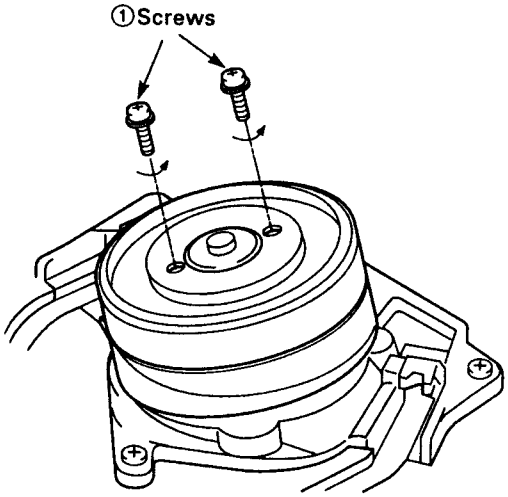


Fig.3-5-1

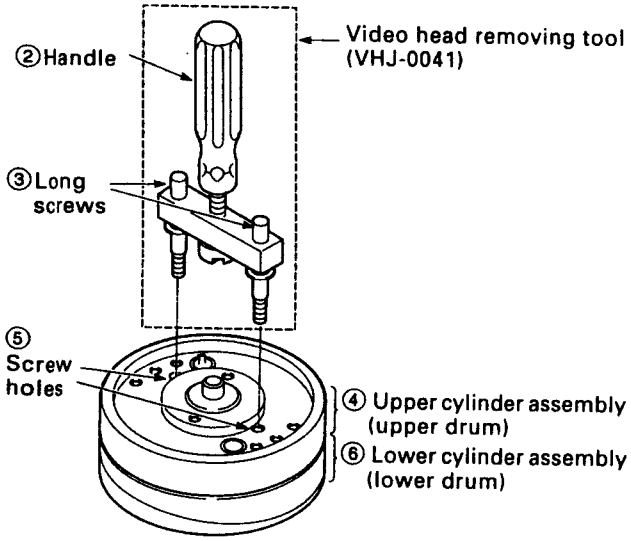


Fig.3-5-2

ASSEMBLY NOTES:

1. When carrying out assembly, the CH-1 head on the upper cylinder assembly (upper drum) ④ and the lower cylinder assembly (lower drum) ⑥ must be aligned. The CH-1 head on the upper cylinder assembly ④ bears a code ⑦ such as 2N4N-Q, 2N4P-QO, 2N4N-QL, 2N4P-QL, 2N4N-SQ, 2N4P-SQ...etc, as shown in Fig.3-5-3. The CH-1 on the lower cylinder assembly ⑥ has a round hole ⑧, as shown in Fig.3-5-4. Assemble the parts so that the round hole ⑧ is next to the code ⑦ on the upper cylinder assembly.
2. Be careful not to scratch the tape path surface of the cylinder. After replacing the cylinder, clean the tape path surface of the cylinder.
3. After replacing the upper cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the swithching position adjustment of the servo circuit.

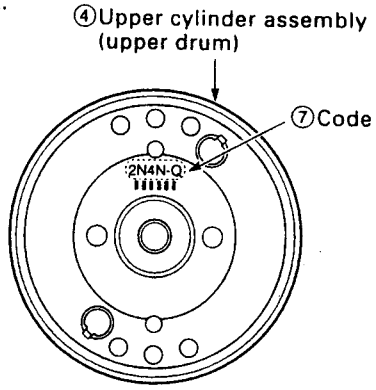


Fig.3-5-3

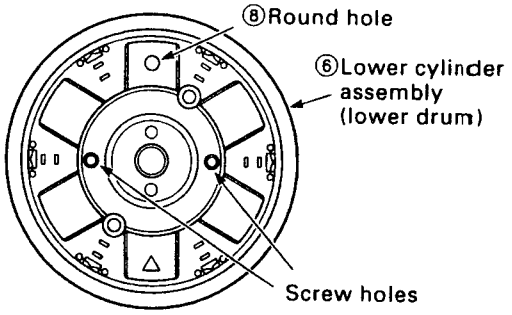


Fig.3-5-4

3-5-2. CYLINDER (DRUM) UNIT (See Fig.3-5-5)

1) Put the mechanism into EJECT mode.
2) Refer to section 3-2 and remove the VM-1/VP-1 PWB assembly
3) Refer to section 3-4 and remove the cleaner lever.
4) Remove the three screws ①. Taking care not to scratch or soil the tape path surface of the cylinder (drum), lift the cylinder mounting ② slightly, and keeping it raised.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rails (front and rear) of the cylinder mounting ② (grease the parts which come in contact with the S and T incline mounting assembly).
2. Align the two dowels ③ on the mounting cylinder ② with the two holes ④ on the mechanism chassis. Check that connector is inserted in the CP-1 PWB assembly.
3. After assembly, clean the tape path surface of the cylinder (drum).
4. After replacing the cylinder unit, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

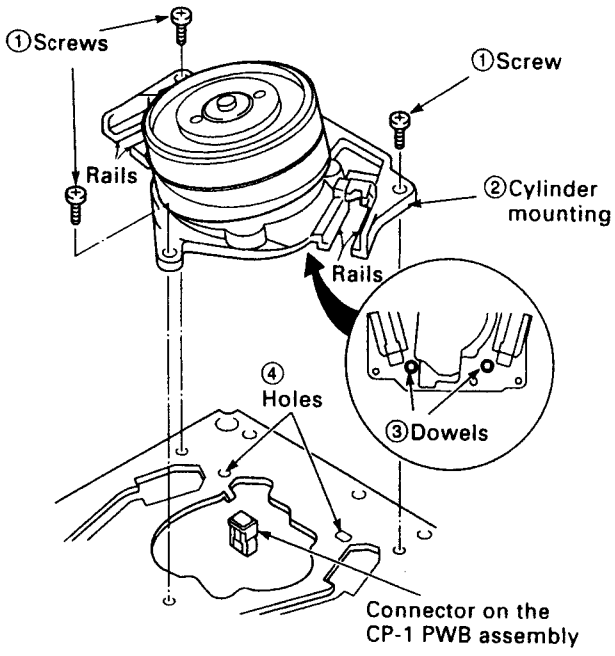


Fig.3-5-5

3-5-3. CYLINDER MOTOR (ROTOR AND STATOR) (See Fig.3-5-6)

1) Refer to section 3-5-2 and remove the cylinder unit.
2) If you have removed the mechanism unit, remove the screw ① and remove the cylinder earth assembly ②.
3) Remove the two screws ③, the rotor ④ and the spacer ⑤.
4) Remove the three screws ⑥ and the stator ⑦.

ASSEMBLY NOTES:

1. When fitting the rotor ④, align the long hole ⑧ - beside the triangular mark on the rotor ④ - with the hole ⑨ in the rotor disk.
2. When fitting the screws ③ and ⑥, use the torque gauge screwdriver (VHJ-0014). give the screws a tightening torque of 3 kg/cm.
3. Align the dowels ⑩ on the cylinder earth assembly ② with the holes ⑪ in the chassis.
4. If you have removed the cylinder unit, after assembly, do the tape path adjustment as instructed in section 4-3, and do the switching position adjustment of the servo circuit.

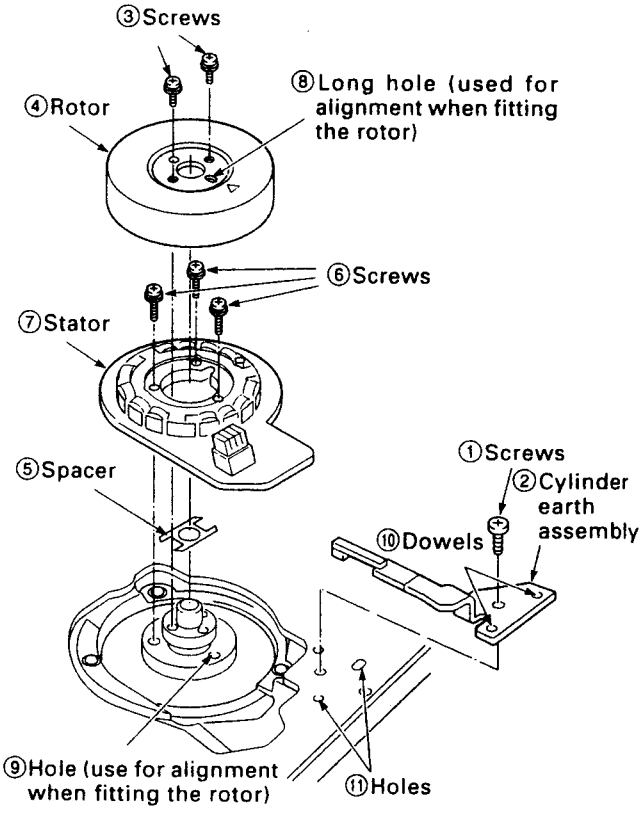


Fig.3-5-6

3-5-4. CYLINDER ASSEMBLY (See Fig.3-5-7)

1) Refer to sections 3-5-2 and 3-5-3, and remove the cylinder unit, the rotor, and the stator.
2) Remove the three screws ① and the cylinder assembly ②.

ASSEMBLY NOTES:

1. Be careful not to scratch or soil the top of the cylinder. After fitting the cylinder, clean the surface.
2. Align the cylinder assembly ② with the two dowels ④ on the cylinder mounting ③.
3. After fitting the cylinder assembly, do the tape path adjustment as instructed in section 4-3 and do the switching position adjustment of the servo circuit.

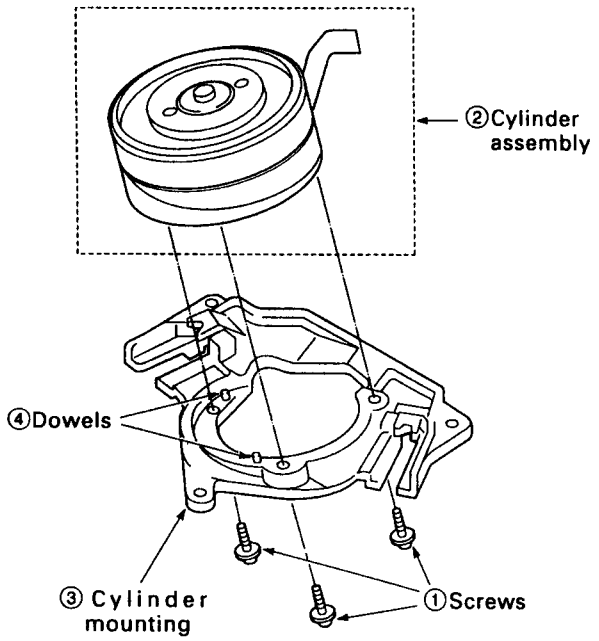


Fig.3-5-7

3-6. FE HEAD AND ACE HEAD

3-6-1. AUDIO R/P HEAD ASSEMBLY (ACE HEAD) (See Fig.3-6-1)

1) Unplug the connector from the audio R/P head assembly (ACE head).
2) Remove the two screws ①, then remove the audio R/P head assembly (ACE head) ②and the washer ③.

ASSEMBLY NOTES:

1. Align the hole ④ on the audio R/P head assembly (ACE head) with the pin ⑤ on the chassis unit.
2. After assembly, check that the clamp ⑥ on the cleaner roller assembly has snapped into the mounting of the audio R/P head assembly (ACE head) ②.
3. After assembly, clean the surface of the head with a soft cloth or chamois.
4. After assembly, refer to section 4-3, and adjust the head height, the azimuth and the tracking (X) position.

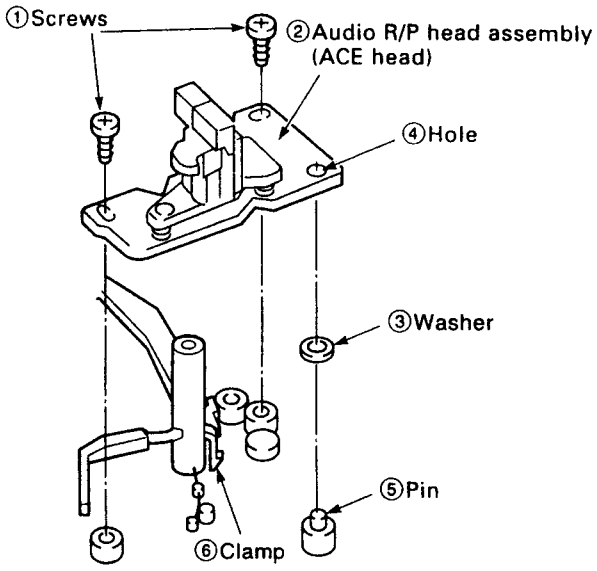


Fig.3-6-1

3-6-2. FULL ERASE HEAD (See Fig.3-6-2)

1) Unplug the connector from the full erase head ①.
2) Remove the screw ② and the full erase head ①.

ASSEMBLY NOTE:

1. After assembly, clean the full erase head ①.

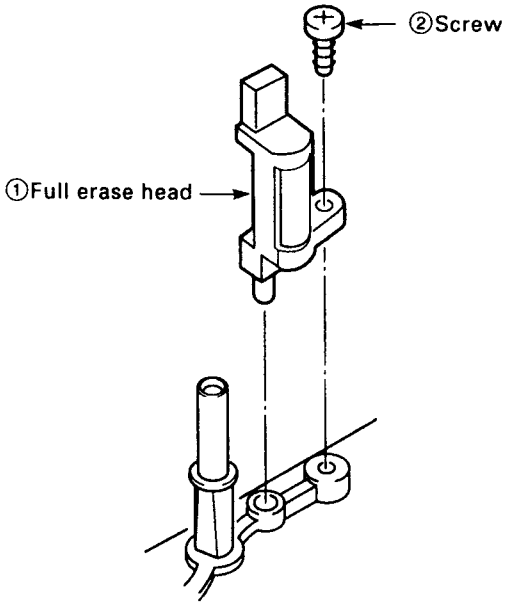


Fig.3-6-2

3-7. CAPSTAN MOTOR

3-7-1. CAPSTAN MOTOR (See Fig.3-7-1)

1) Refer to section 3-2, then remove the mechanism unit.
2) Remove the screw ①, then remove the capstan mounting ②.
3) Remove the reel belt ③.
4) Remove the three screws ④ and the capstan motor ⑤.

ASSEMBLY NOTES:

1. Check that connector ⑥ is inserted in the CP-1 PWB assembly.
2. When fitting the three screws ④, use the torque gauge screwdriver (VHJ-0014). Give the screws a tightening torque of 3.5 kg/cm.
3. After assembly, clean the capstan shaft with a soft cloth or chamois.

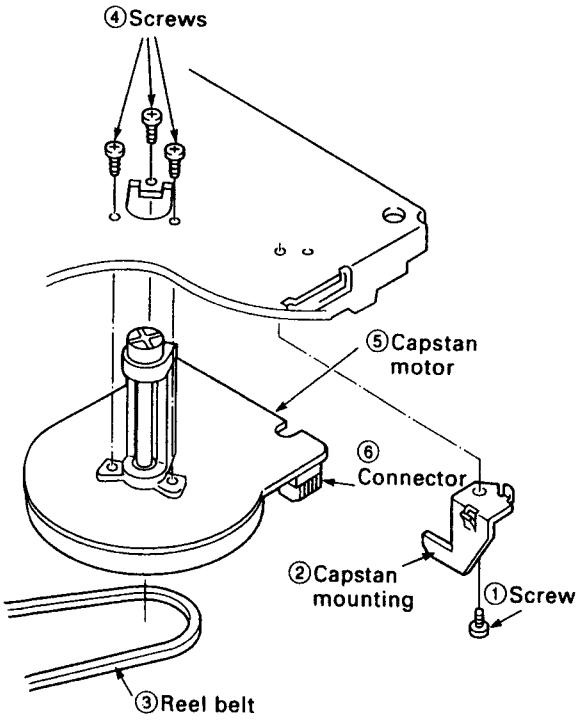


Fig. 3-7-1

3-7-2. CAPSTAN BRAKE ASSEMBLY (See Fig.3-7-2)

1) Remove the spring ①.
2) Remove the clamp ②, then remove the capstan brake assembly ③.

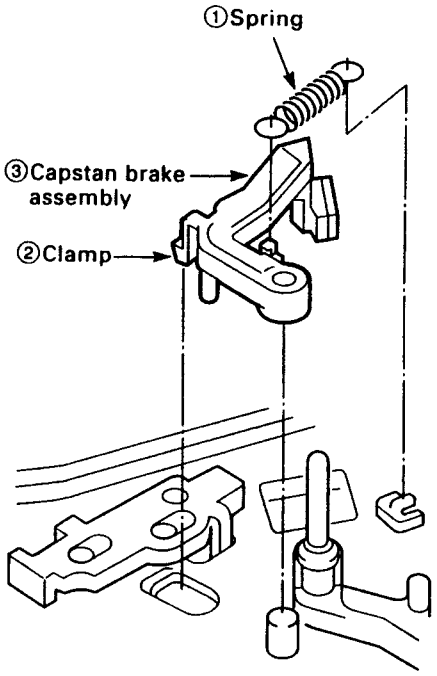


Fig.3-7-2

3-8. LOADING MOTOR ASSEMBLY AND WORM GEAR ASSEMBLY (See Fig.3-8-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the soldering on the lead wires ② of the loading motor assembly from the MC-1 PWB assembly. When you do this, be careful not to let the soldering iron touch any other parts.
3) Press the clamp ③, and remove the loading motor assembly ① and the damper ④. Be careful not to exert too much force on the clamp ③.
4) Remove the worm gear assembly ⑤. To maintain performance, do not dis-assemble the worm gear assembly ⑤.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0010) to the teeth of the worm gear assembly.
2. Check that the clamps ③ and ⑥ are securing the loading motor assembly.
3. Check the polarity of the lead wires ② (the orange wire is the positive terminal, and the gray wire is the negative terminal). After soldering the lead wires ②, adjust them so that they do not touch the friction gear assembly.

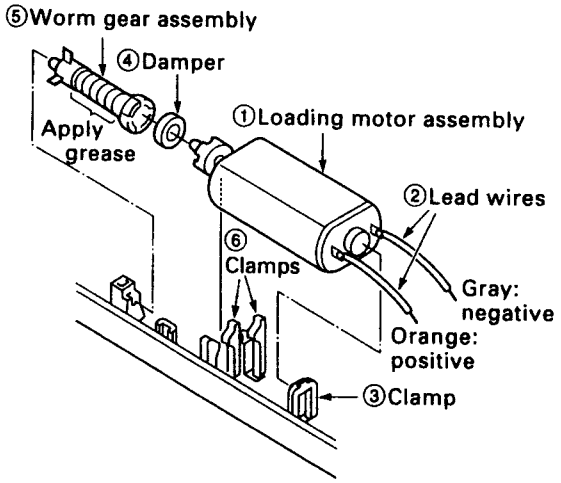


Fig.3-8-1

3-9. PINCH ROLLER PRESSURE MECHANISM

3-9-1. PINCH ROLLER LEVER ASSEMBLY (See Fig.3-9-1)

1) Remove the clamp ①, then remove the pinch lift mounting ②.
2) Remove the spring ③, then remove the pinch roller lever assembly ④ off the pinch lift mounting ②. Before you do this, align the Indentation ⑤ on the pinch roller lever assembly ④ with the clamp ⑥ on the pinch lift mounting ②.

ASSEMBLY NOTE:

1. Be careful to keep the surface of the pinch roller free of dust and dirt.

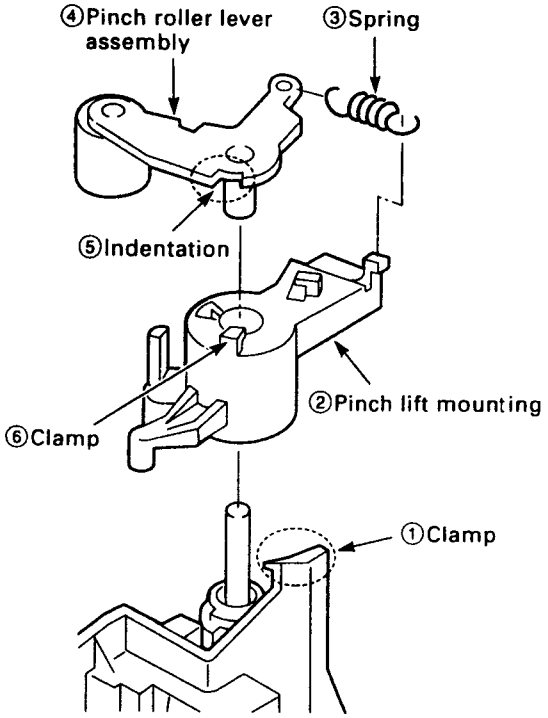


Fig.3-9-1

3-9-2. PINCH LIFT CAM AND PINCH CAM GEAR (See Figs.3-9-2 and 3-9-3)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-9-1 and remove the pinch roller lever assembly.
3) After removing the screw ①, undo the three clamps ②, then remove the opener mounting ③.
4) Remove the clamp ④ and the pinch lift cam ⑤.
5) Remove the pinch cam gear ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) around the shaft ⑦, all over the teeth Ⓑ of the pinch cam gear ⑥, all over the teeth of the pinch lift cam ⑤, all over the cam grooves Ⓐ, and all over the "V Part Ⓒ" of the opener mounting ③. Apply grease (VHJ-0101) to the outside of the shaft Ⓑ and all over the top cam Ⓓ of the pinch cam gear ⑥.
2. Check that the positioning mark ⑩ on the mode switch ⑨ is aligned with the arrow ⑪ on the MC-1 PWB assembly, as shown in Fig.3-9-3. Then align the triangular mark ⑫ on the pinch cam gear ⑥ with the arrow ⑪ on the MC-1 PWB assembly. After that, align the round hole ⑬ on the pinch lift cam ⑤ with the indentation ⑭ on the pinch cam gear ⑥.
   If you have carried out the above alignments and the pinch roller will still not move up and down or perform the pressing movement correctly, refer to section 3-15 and check the alignment of the gear wheels 1 and 2, the main cam, and the mode switch.

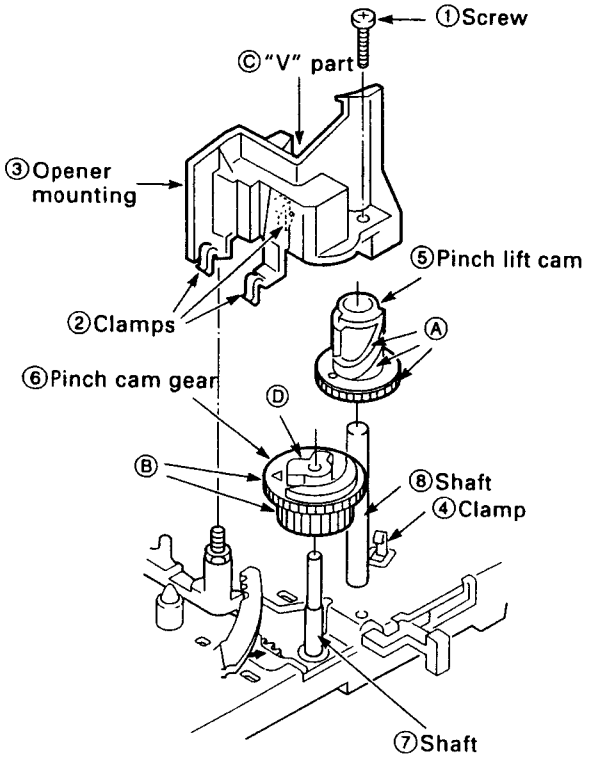


Fig.3-9-2

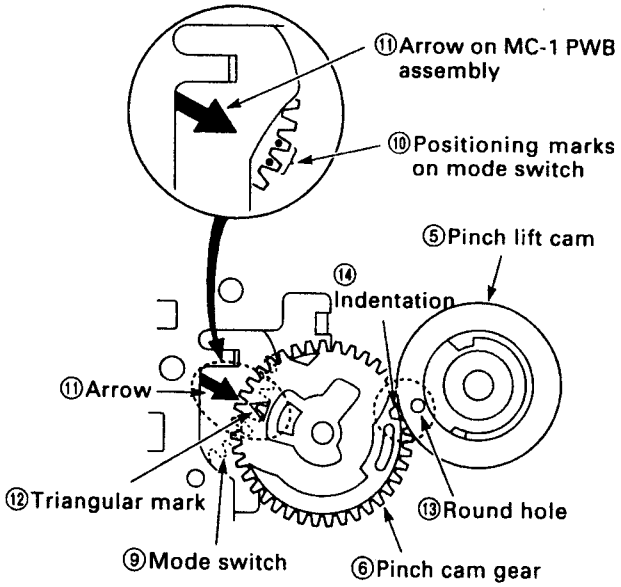


Fig.3-9-3

3-10. L GUIDE ACT LEVER ASSEMBLY, LOAD LEVER ASSEMBLY AND STOPPER LEVER ASSEMBLY (See Fig.3-10-1)

1) Refer to section 3-3 and remove the cassette mechanism assembly.
2) Refer to sections 3-9-1 and 3-9-2 ,then remove the pinch roller lever assembly and the opener mounting.
3) Remove the stopper spring ①.
4) After removing the washer ②, remove the L guide act spring ③ and the L guide act lever assembly ④.
5) Remove the special nut ⑤, then remove the load lever assembly ⑥ and the L guide lever spring ⑦.
6) Remove the stopper lever assembly ⑧.

ASSEMBLY NOTES:

1) Apply grease (VHJ-0100) to the toothed area Ⓐ of the L guide act lever assembly ④ and around the shafts ⑨ and ⑩.
2) Refer to section 4-3 and adjust the height of the load lever assembly.
3) Hook the L guide lever spring ⑦ into the stopper ⑪ and the load lever assembly ⑥ shown in Fig. A.
4) Put the pin ⑫ of the L guide act lever assembly into the cam groove ⑬ of the crescent slide.

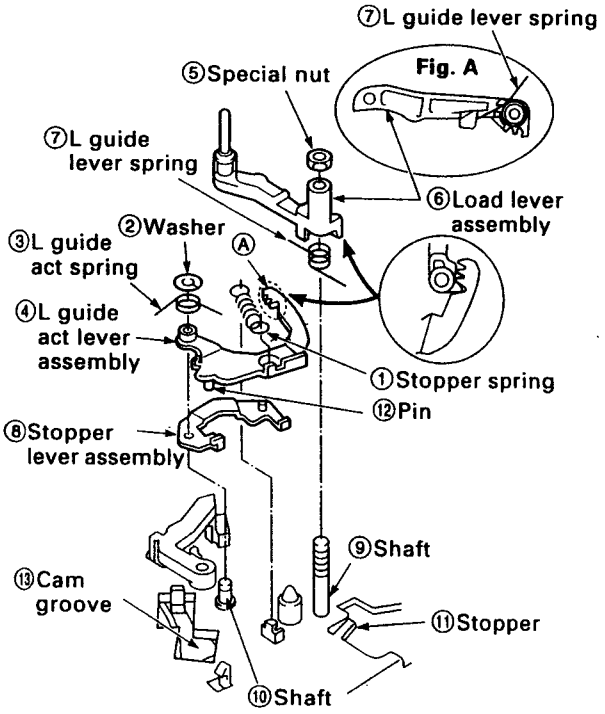


Fig.3-10-1

3-11. BT LEVER ASSEMBLY (See Fig.3-11-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the BT spring ①, and remove the sub BT spring ② on the underside of mechanism chassis.
4) Remove the clamp ③ on the underside of the mechanism chassis, then remove the BT lever assembly ④.
5) Remove the clamp ⑤ on the band brake assembly ⑥. Then, as shown in Fig. A, align the other end of the band brake assembly with the protruding parts of the BT lever assembly ④ before removing it.

ASSEMBLY NOTES:

1. When fitting the BT lever assembly ④, be careful not to bend the stopper ⑦ or the S incline mounting assembly ⑧ out of shape by knocking it against them.
2. Hook the long hook of the BT spring ① into the BT lever assembly ④, as shown in Fig. B.
4. After assembly, make sure that the mountings on both ends of the band brake assembly ⑥ are positioned as shown in Fig. C.
5. After assembly, refer to section 4-2-1, and make the appropriate adjustment.

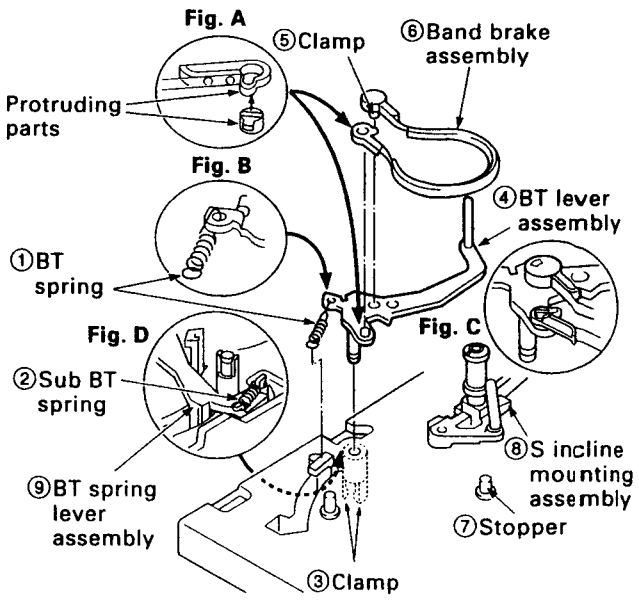


Fig.3-11-1

3-12. REEL DRIVE MECHANISM

3-12-1. REEL BELT, REEL PULLEY, FRICTION GEAR ASSEMBLY AND CLUTCH CHANGE LEVER (See Fig.3-12-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Remove the reel belt ① from the reel pulley ②.
3) Take off the washer ③ and remove the reel pulley ②.
4) Take off the washer ④ and remove the friction gear assembly ⑤.
5) Remove the clutch change spring ⑥.
6) remove the clamp ⑦ gripping the top of the mechanism chassis, then remove the clutch change lever ⑧.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑨ and ⑩, apply a drop of oil (VHJ-0099) to each.
2. Be careful not to get any grease on the reel belt ①.

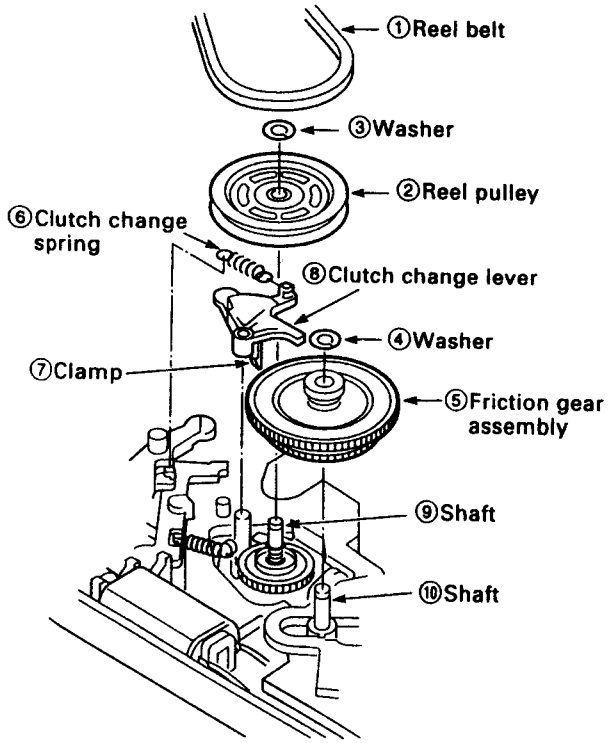


Fig.3-12-1

3-12-2. CLUTCH MOUNTING ASSEMBLY (See Fig.3-12-2)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Refer to section 3-12-1 and remove the reel pulley.
3) Remove the two screws ①, then remove the clutch mounting assembly ②.

ASSEMBLY NOTES:

1. Align the two holes ③ with the shafts ④ and ⑤. Be careful not to press part A of the clutch mounting assembly ② against the band brake assembly.
2. After assembly, make sure that the clamp on the clutch change lever has snapped into the chassis.

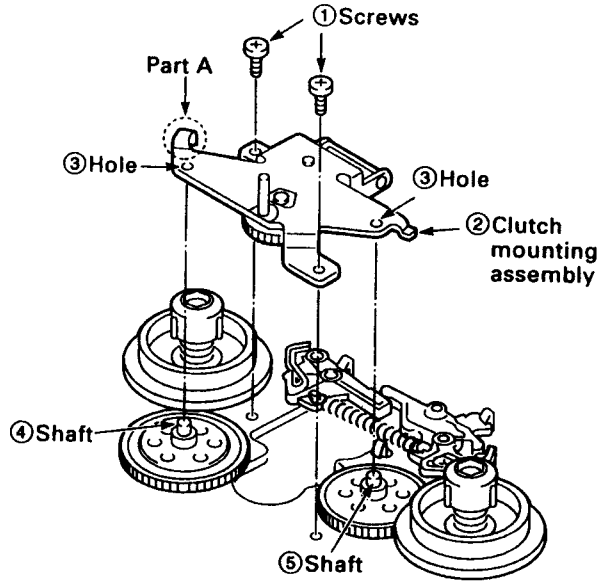


Fig.3-12-2

3-12-3. S SOFT LEVER, SUPPLY REEL ASSEMBLY AND S REEL GEAR (See Fig.3-12-3)

1) Remove the S soft spring ①.
2) Remove the clamp ②, then remove the S soft lever ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Refer to section 3-11 and remove the band brake assembly, then remove the supply reel assembly ④ and the S reel gear ⑤.

ASSEMBLY NOTES:

1. After cleaning the shafts ⑥ and ⑦, apply a drop of oil (VHJ-0099) to each.
2. After assembly, clean the side of the supply reel assembly ④.

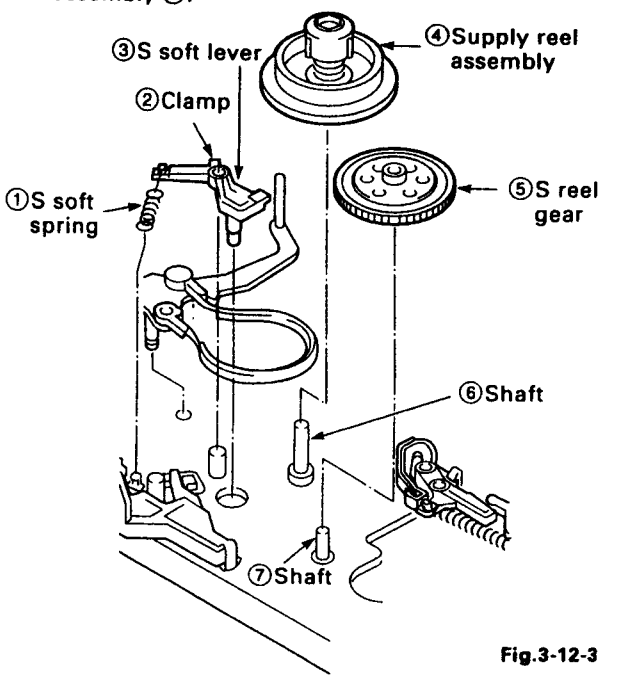


Fig.3-12-3

3-12-4.T SOFT BRAKE ASSEMBLY, TAKE UP REEL ASSEMBLY, T REEL GEAR (See Fig.3-12-4)

1) Remove the T soft spring ①.
2) Remove the clamp ② , then remove the T soft brake assembly ③.
3) Refer to section 3-12-2 and remove the clutch mounting assembly.
4) Pressing the T brake assembly ④ in the direction of the arrow, remove the take up reel assembly ⑤ and the T reel gear ⑥.

ASSEMBLY NOTE:

1. After cleaning the shafts ⑦ and ⑧, apply a drop of oil (VHJ-0099) to each.

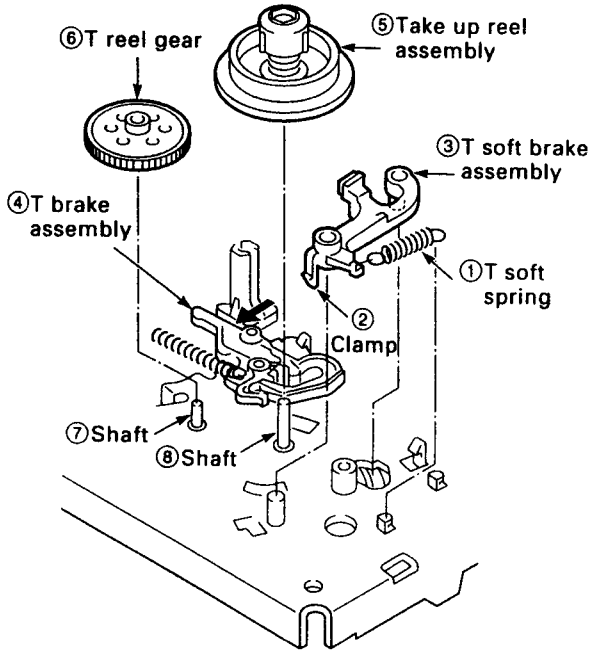


Fig.3-12-4

3-13. BRAKES

3-13-1.S BRAKE ASSEMBLY, T BRAKE ASSEMBLY, T BRAKE ACT SLIDE (See Fig.3-13-1)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the two clamps ①, then remove the T brake act slide ②. (Note: You can remove the S brake assembly ⑦ and the T brake assembly ⑤ without removing the T brake act slide ②.)
3) Remove the brake spring ③.
4) Remove the two clamps ④ simultaneously, then remove the T brake assembly ⑤.
5) Remove the clamp ⑥, then remove the S brake assembly ⑦.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧ and ⑨.
2. When fitting the T brake act slide ②, align the mark ⑩ with the shaft ⑪.

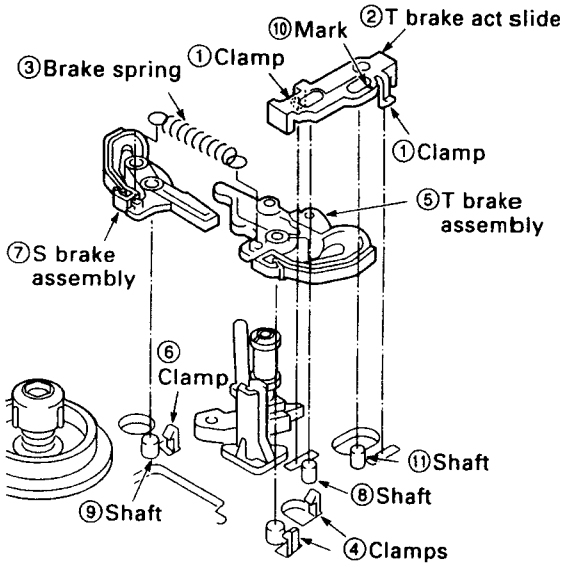


Fig.3-13-1

3-13-2. BRAKE CONTROL LEVER AND BRAKE ACT LEVER ASSEMBLY (See Fig.3-13-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-15 and remove the wheel gear 2.
3) Refer to sections 3-12-1, then remove the reel belt and the reel pulley.
4) Remove the clamp ①, then remove the wheel gear 1 ②.
5) Remove the clutch change spring ③.
6) Remove the clamps ④ and ⑤, then remove the brake control lever ⑥. Remove the clamp ④ on the topside of the mechanism chassis.
7) Remove the brake return spring ⑦.
8) Refer to section 3-8 and remove the worm gear assembly.
9) Remove the clamp ⑧ and clamp ⑤, then remove the brake act lever assembly ⑨. To maintain the performance of the brake act lever assembly ⑨, do not disassemble it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑩ and ⑪, to the teeth of the wheel gear 1 ②, and to the pin ⑫ of the brake control lever ⑥.
2. Put the pin ⑫ of the brake control lever ⑥ into the cam groove ⑭ of the crescent slide.
3. Before fitting the wheel gear 1 ②, align the hole ⑮ with the hole ⑯ on the mechanism chassis.
4. Refer to section 3-15 and align the wheel gear 2.

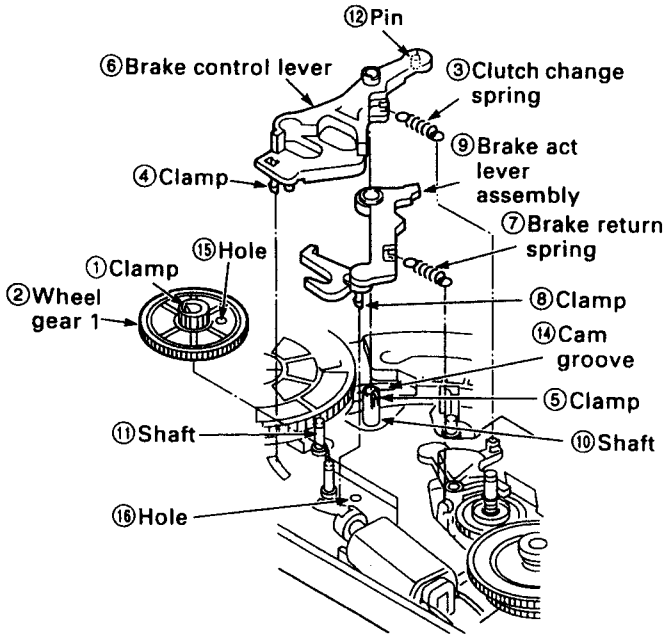


Fig.3-13-2

3-13-3. S BRAKE ACT SLIDE AND BT SPRING LEVER ASSEMBLY (See Figs.3-13-3 and 3-13-4)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-12-1 and remove the friction gear assembly.
3) Slide the S brake act slide ① in the direction of the arrow Ⓐ, then remove it.
4) Refer to section 3-11 and remove the BT spring.
5) Remove the sub BT spring ②.
6) Press the BT spring lever assembly ③ until it touches the pin ④, then remove it.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shaft ⑤ shown in Fig. 3-13-3, and to the BT spring lever assembly ③ and the S brake act slide ① shown in Fig.3-13-4.
2. After mounting the BT spring lever assembly ③ on the Shaft ⑤, hook the BT spring onto the clamp ⑥ and press it until it touches the pin ⑦.
3. Make sure that the clamps ⑧, ⑨ and ⑩ have snapped into the S brake act slide ①. Align the arrow ⑪ on the S brake act slide ① with the arrow ⑫ on the mechanism chassis.

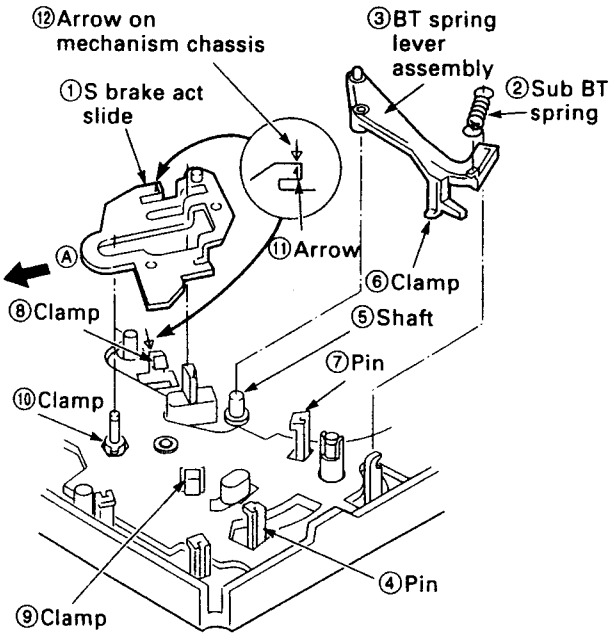


Fig.3-13-3

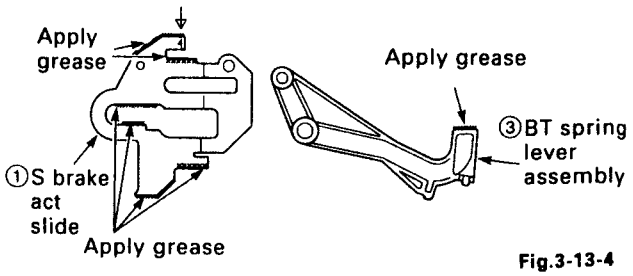


Fig.3-13-4

3-14. GUIDES

3-14-1. GUIDE ROLLER ASSEMBLY (See Fig.3-14-1)

1) Unscrew the two screws ①. When you do this, be careful not to damage the cylinder or the video head.
2) Remove the two guide roller assemblies ② by unscrewing them counterclockwise.

ASSEMBLY NOTES:

1. Tighten the two screws ① to a torque of 600 g/cm. After tightening, apply a screw-locking glue.
2. After replacing the parts, be sure to clean the guide roller and carry out tape path adjustment as described in section 4-3.

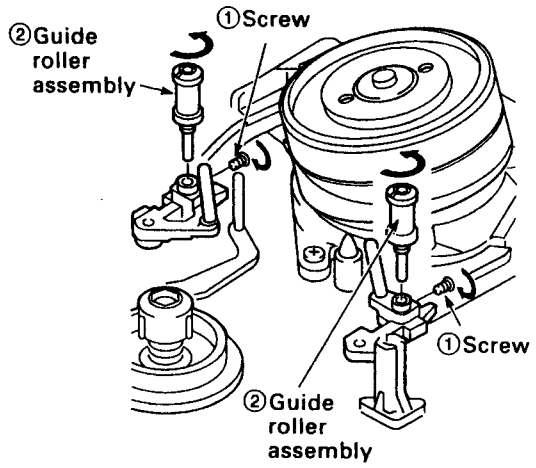


Fig.3-14-1

3-14-2.S AND T INCLINE MOUNTING ASSEMBLIES (See Fig.3-14-2)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-5-2 and remove the cylinder unit.
3) Refer to section 3-1 and rotate the loading motor in the PLAY direction until tape loading is completed.
4) Shift the S incline mounting assembly ① slightly, in the direction of the arrow Ⓐ, then remove it from the S load lever assembly ②.
5) Shift the T incline mounting assembly ③ slightly, in the direction of the arrow Ⓑ, then remove it from the T load lever assembly ④.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the rail (top, underside and sides) on the mechanism chassis.
2. When fitting the S and T incline mounting assemblies ① and ③ into the rail, turn the loading motor manually in the EJECT direction. When tape unloading begins, watch out in case the S and T incline mounting assemblies ① and ③ get caught in the rail.
3. After replacing the parts, clean the cylinder and the roller guide, then adjust the tape path as described in section 4-3.

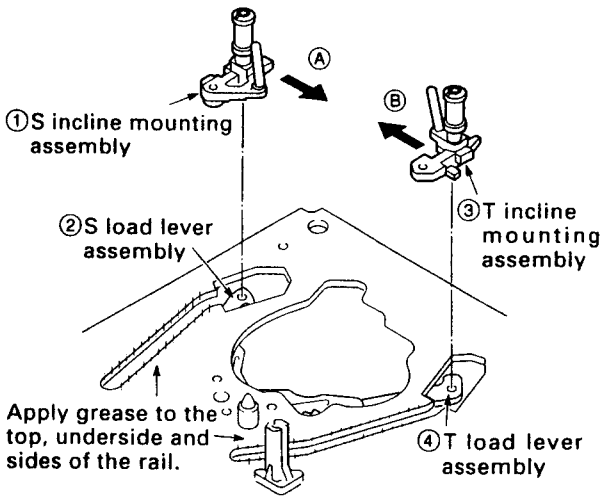

Ⓐ
Ⓑ
①S incline mounting assembly
②S load lever assembly
③T incline mounting assembly
Apply grease to the top, underside and sides of the rail.
④T load lever assembly

Fig.3-14-2

3-15. WHEEL GEAR 2, MAIN CAM AND MODE SWITCH (See Figs.3-15-1 and 3-15-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-7-1, then remove the harness mounting.
3) Remove the clamp ①, then remove the wheel gear 2 ②.
4) Remove the washer ③, then remove the main cam ④.
5) After unscrewing the screw ⑤, remove the soldering from the terminal of the mode switch ⑥.
6) Remove the clamp ⑦, then remove the mode switch ⑥.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and ⑩, to the teeth of the main cam ④, and to the all over the cam groove of main cam ④.
2. When fitting the mode switch ⑥, align it in ⒶⒷ order as shown in Fig.3-15-2. The alignment of the part Ⓑ is shown in Fig. A. Position the teeth of the mode switch ⑥ so that the sixth tooth space left of part Ⓐ is aligned with the triangular mark on the pinch cam gear ⑪. After aligning part Ⓑ, refer to section 3-9-2 and check the positioning of the mode switch, the pinch cam gear and the pinch lift cam.
3. Beforehand, remove the soldering from the soldered part of the MC-1 PWB assembly, in order to prevent the mode switch ⑥ being warped. Solder the mode switch ⑥ after tightening the screw ⑤ (See Fig. 3-15-1).
4. Align the hole in the crescent slide ⑫ with the hole in the mechanism chassis, as shown at point Ⓖ in Fig.3-15-2 (refer to section 3-16 and see the holes ⑤ and ⑥ in Fig.3-16-1).
5. When fitting the main cam ④, position the mode switch ⑥ and the front rack gear ⑬ as shown at points Ⓒ and Ⓓ respectively in Fig.3-15-2.
6. When fitting the gear wheel 2 ②, position the main cam ④ and the wheel gear 1 ⑭ as shown at points Ⓔ and Ⓕ respectively in Fig.3-15-2.

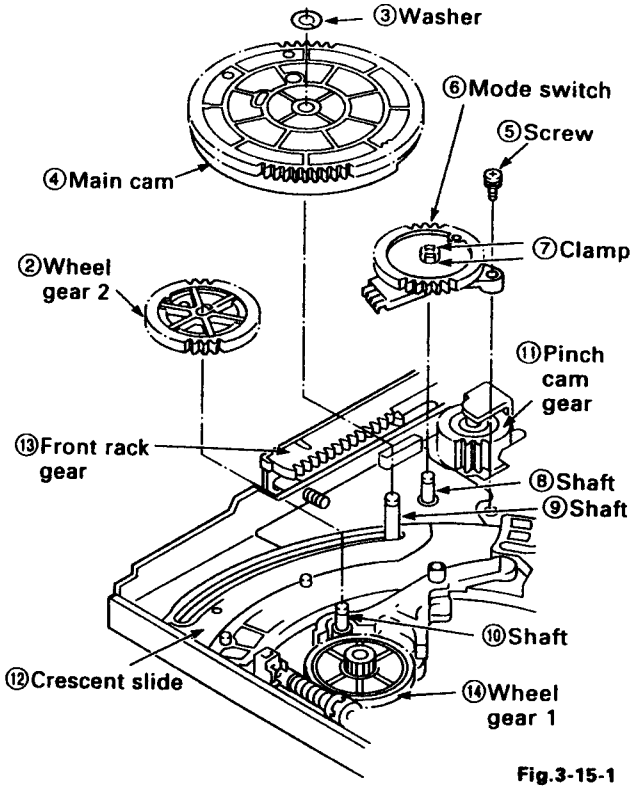


Fig.3-15-1

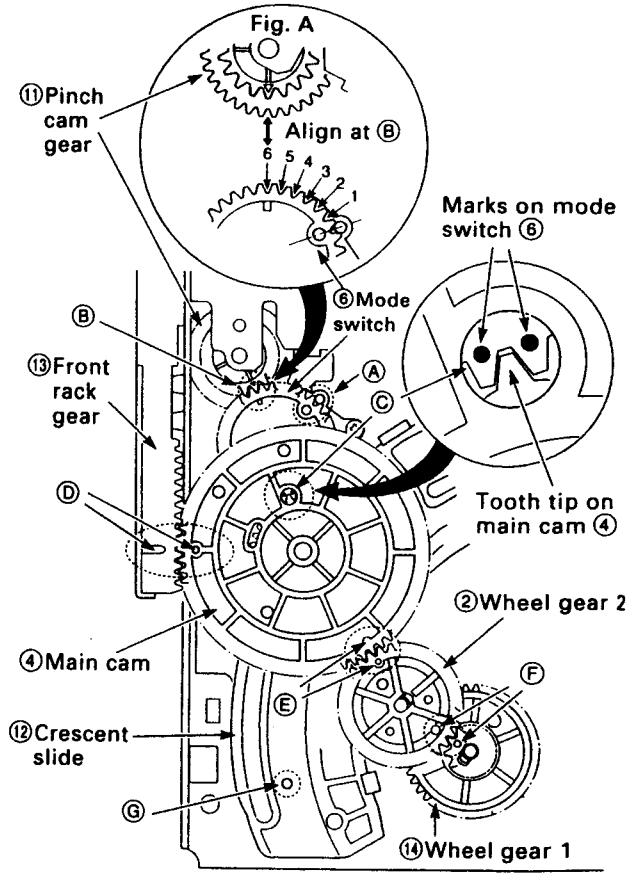


Fig.3-15-2

3-16. CRESCENT SLIDE
(See Figs.3-16-1 and 3-16-2)

1) Refer to section 3-2 and remove the mechanism unit. When you do this, make sure the mechanism is in EJECT mode.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Refer to section 3-7-2 and remove the capstan brake assembly.
4) Refer to section 3-12-4 and remove the T soft brake assembly.
5) Refer to section 3-13-1 and remove the T brake act slide.
6) Refer to section 3-12-1, then remove the reel belt and the reel pulley.
7) Refer to section 3-15, then remove the wheel gear 2 and the main cam.
8) Refer to section 3-13-2, then remove the wheel gear 1 and the brake control lever.
9) Remove the two screws ⑪, then remove the crescent mounting ⑫.
10) Remove the clamps ① and ②, then raise the right end of the crescent slide ③ slightly. Slide the crescent slide ③ to the right until it comes away from the clamp ④, then remove it.

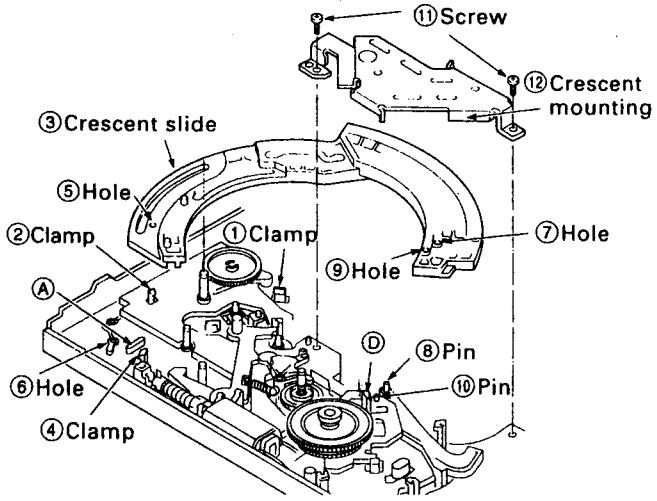


Fig.3-16-1

Apply grease to the areas shown in ▒▒
• The places marked by dots should be greased particularly generously.

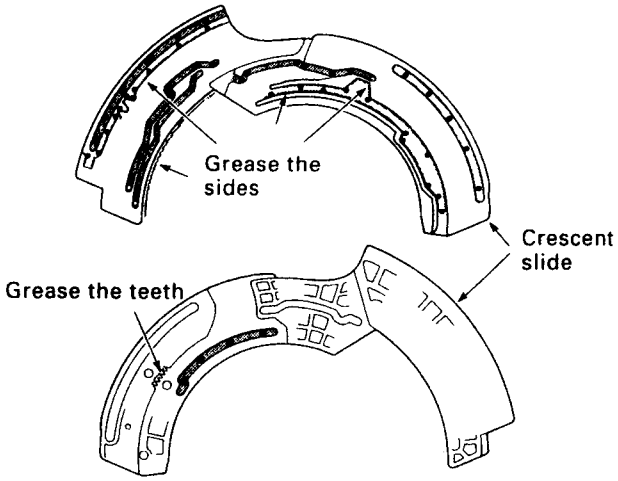


Fig.3-16-2

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the points Ⓐ,Ⓑ,Ⓒ and Ⓓ in Fig.3-16-1, and to the crescent slide ③ shown in Fig.3-16-2.
2. Before fitting the crescent slide ③, refer to section 3-13-3 and align the arrow on the S brake act slide with the arrow on the mechanism chassis. Then refer to Fig.3-17-3 and check that the S load gear and the T load gear have completed tape unloading.
3. When assembling the parts, raise the right side of the crescent slide ③ slightly, and keeping it in this position, slot the left side into the clamp ④, then align the hole ⑤ with the hole ⑥ in the mechanism chassis. When you do this, check that the hole ⑦ is aligned with the pin ⑧ on the BT spring lever assembly, and that the hole ⑨ is aligned with the pin ⑩ on the S brake act slide, before pressing the crescent slide ③ into place. Check that the clamps ①, ② and ④ are engaged.
4. After assembly, check that each lever and each brake is working properly.

3-17. S LOAD GEAR, T LOAD GEAR, S LOAD LEVER ASSEMBLY AND T LOAD LEVER ASSEMBLY (See Figs.3-17-1, 3-17-2 and 3-17-3)

1) Refer to section 3-16 and remove the crescent slide.
2) Refer to section 3-14-2 and remove the S and T incline mounting assemblies.
3) Remove the clamp ①, then remove the components: the S load gear ②, the S load spring ③ and the S load lever assembly ④. When you do this, be careful not to damage the clamp ①, which can be damaged easily. Again, be careful when you disassemble the components, as the S load spring ③ will spring out.
4) Remove the following components: the T load gear ⑤, the T load spring ⑥, and the T load lever assembly ⑦. Be careful when you disassemble the components, as the T load spring ⑥ will spring out.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the shafts ⑧, ⑨ and parts A shown in Fig.3-17-1. Then apply grease (VHJ-0100) to the parts shown in Fig.3-17-2.
2. When fitting the S load gear ② and the T load gear ⑤ align them in the tape-loaded state, as shown in Fig. A in Fig.3-17-3. Again, after completing tape-unloading on these gears, check that they are positioned as shown in Fig. B in Fig.3-17-3, then refer to section 3-14-2 and fit the S and T incline mounting assemblies.

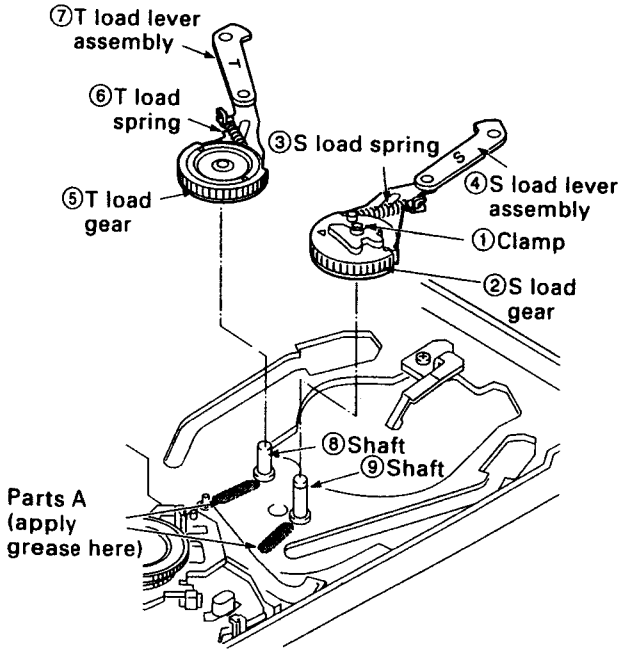
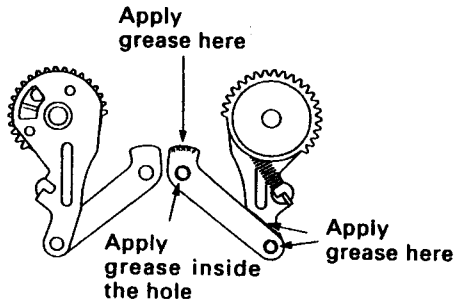


Fig.3-17-1

(T side)



(S side)

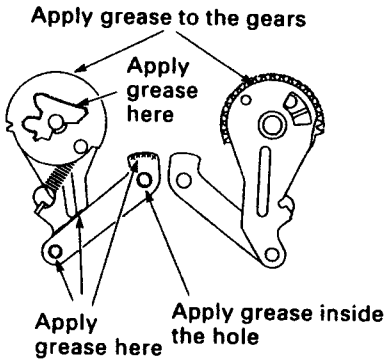


Fig.3-17-2

Fig. A: When tape loading is complete

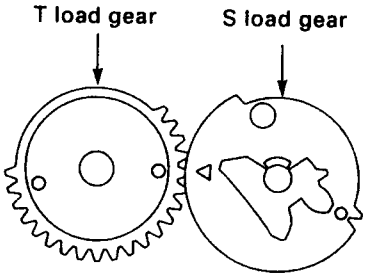


Fig. B: When tape unloading is complete

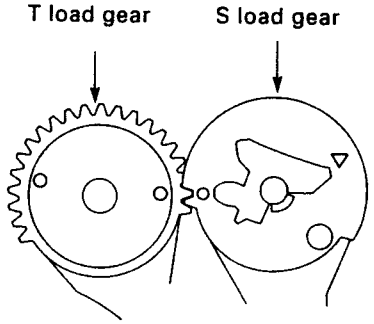


Fig.3-17-3

3-18. TAPE SENSORS, REEL SENSOR AND EP SW LEVER

3-18-1 TAPE TOP SENSOR AND TAPE END SENSOR (See Fig.3-18-1)

1) Refer to section 3-2 and remove the mechanism unit.
2) Refer to section 3-3-1 and remove the cassette mechanism assembly.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diodes ①, ② and the LED ③. When removing the photo diode ② on the tape top sensor side, refer to section 3-15 and remove the main cam.

ASSEMBLY NOTES:

1. Fit the photo diodes ① and ② so that their photo-receptors to face the LED ③, as shown in Fig.3-18-1. Align the cuts in the LED ③ and the holder ④. Push the photo diodes ①, ② and the LED ③ as far down as they will go, so that they do not protrude above the top of their holders.
2. Do the soldering quickly.

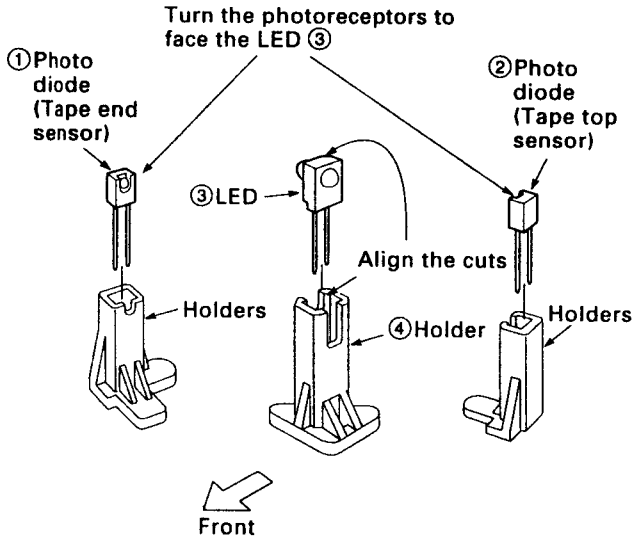


Fig.3-18-1

3-18-2. REEL SENSOR (See Fig.3-18-2)

1) Refer to sections 3-12-2 and 3-12-4, then remove the clutch mounting assembly, the T soft brake assembly and the take up reel assembly.
2) Refer to section 3-13-2, then remove the wheel gear 2, the wheel gear 1, and the brake control lever.
3) Remove the soldering from the MC-1 PWB assembly, then remove the photo diode (reel sensor) ①.

ASSEMBLY NOTES:

1. When assembling the parts, align the cut on the photo diode (reel sensor) ① with the protrusion on the mechanism chassis ②.
2. Do the soldering quickly.

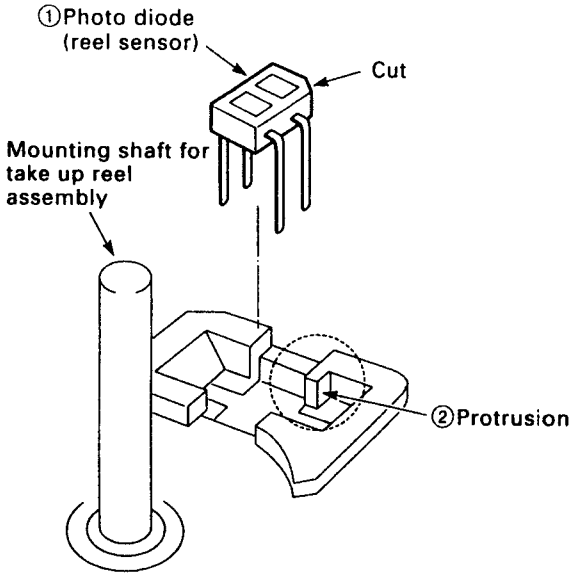


Fig.3-18-2

3-18-3.EP SWITCH LEVER (See Fig.3-18-3)

1) Refer to section 3-3-1 and remove the cassette mechanism assembly.
2) Remove the EP switch spring ①.
3) Remove the clamp ②, then remove the EP switch lever ③.

ASSEMBLY NOTES:

1. Apply grease (VHJ-0100) to the protrusion ④ on the back of the EP switch lever ③.
2. After fitting the cassette mechanism assembly, check that in EJECT mode, the EP switch lever ③ does not touch the EP switch ⑤.

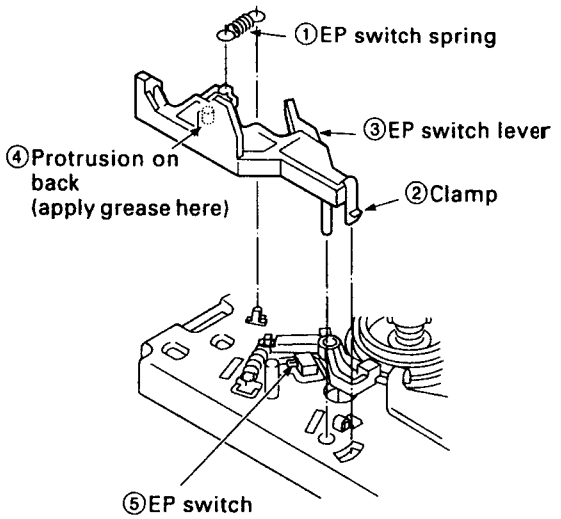


Fig.3-18-3

4. MECHANISM CHECKS AND ADJUSTMENTS

4-1. REEL TABLE TORQUE CHECK

1)With the power switch turned OFF, stick black vinyl tape over the photo diodes of the tape sensors. Then turn the power switch ON. Front loading will begin. Refer to section 3-2 and Fig.3-2-2, and release the locks of the tray lock lever and the lid opener lever.

NOTES:

1. The measurements must be taken without any incandescent light or daylight.
2. If the mechanism cannot be put into PLAY, FF or REW mode by the method described in 1) above, make a dummy cassette tape, as shown in Fig.4-1-2. The dummy cassette tape is made as follows: Unscrew the five screws on the underside, remove the reels, leaf springs and other parts on the supply and take up sides, make holes in the upper surface as wide as the reel diameter, then assemble the parts.

2) Put the mechanism into REW mode, wait at least 10 seconds, then measure the torque value of the reel table on the supply side. It should be at least 600 g/cm.
   Take the measurement with the torque dial gauge (VHJ-0004) held in position in your hand (lock torque). While taking the measurement, rotate the reel table (take up reel assembly) on the take up side with your hand so that the reel sensor does not respond.
3) After switching to FF mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be at least 600g/cm (lock torque).
4) After switching to PLAY mode, wait for at least 10 seconds and then measure the torque value of the reel table on the take up side. It should be between 55 and 110g/cm (lock torque).

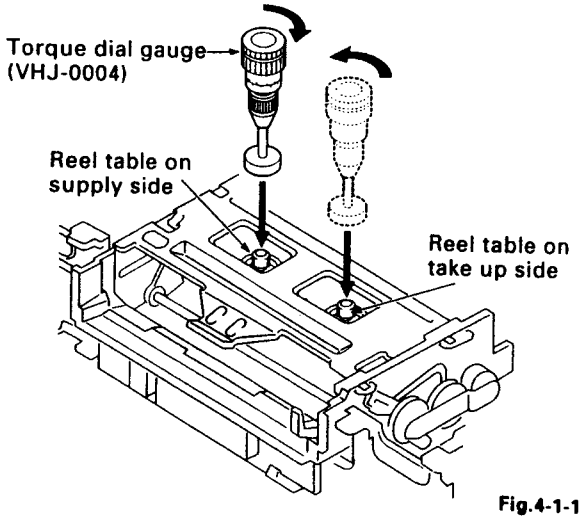


Fig.4-1-1

5) After switching to REVIEW mode, wait for at least 10 seconds and then measure the torque value of the reel table on the supply side.It should be between 110 and 210 g/cm (lock torque).

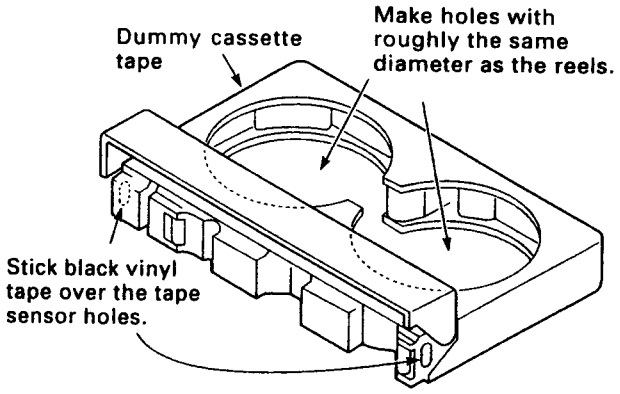


Fig.4-1-2

4-2. ADJUSTING THE BT LEVER ASSEMBLY POSITION AND CHECKING THE BACK TENSION TORQUE IN PLAY MODE

4-2-1. BT LEVER POLE POSITION ADJUSTMENT (See Fig.4-2-1)

1) Without loading a cassette tape, put the mechanism into PLAY mode (turn the power switch OFF).
2) Adjust point Ⓐ on the band brake assembly by rotating it so that the tip of the BT lever assembly is aligned with the line on the left side of the mechanism chassis.
3) Refer to section 4-2-2 and check that the back tension torque is between 30 and 50g/cm.

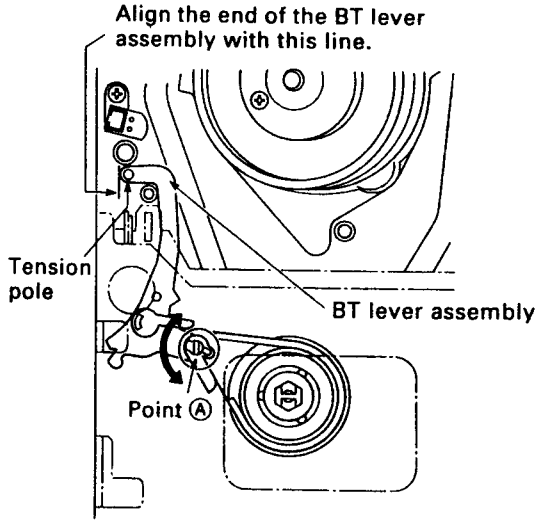


Fig.4-2-1

4-2-2. CHECKING THE BACK TENSION TORQUE PLAY MODE

1) Mount the cassette torque meter (VHJ-0016) and switch to PLAY mode.
2) Check that the back tension torque is between 30 and 50g/cm.

4-3. TAPE PATH ADJUSTMENT

In normal circumstances, the tape path system does not need to be adjusted. However, after removing or replacing one of the parts shown in Fig.4-3-1, you should check and adjust the tape path. The adjustment of the tape path is carried out while monitoring the envelope waveform of the video head output, using an oscilloscope. To make sure that the tape drawn off the reel runs freely and without excessive tension along all the tape guides and cylinders (drums), it is also important to check each tape guide by eye.

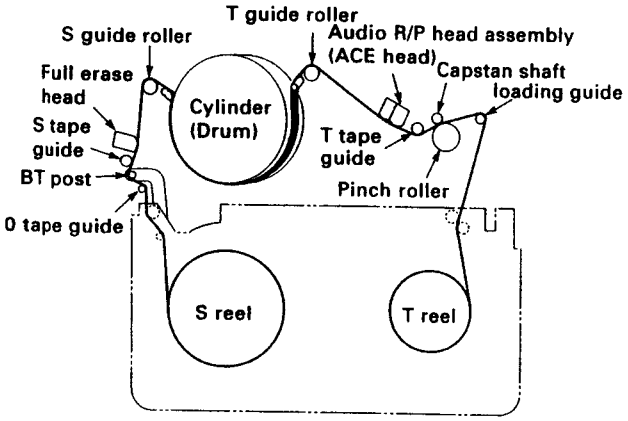


Fig.4-3-1

4-3-1. ADJUSTMENT PROCEDURE

1. Select a PAL or NTSC alignment tape or blank cassette tape, according to the transmission system of the VCR you are repairing.

NTSC: For models with 525 scanning lines and a field frequency of 60Hz
PAL: For models with 625 scanning lnes and a field frequency of 50Hz

2. Clean the tape guides, the cylinder (drum), the capstan Shaft, the audio R/P head (ACE head) and the full erase head.
3. Using an oscilloscope, adjust the height of the guide roller and carry out horizontal position adjustment,height adjustment and azimuth adjustment on the audio R/P head (ACE head). When observing the envelope waveform, bring the CH-1 probe into contact with the envelope waveform test point, and bring the CH-2 probe into contact with the switching pulse (SW P) test point. While adjusting the tape path, set the trigger at the low side of the switching pulse (SW P) in order to observe the output waveform on the CH-1 side of the video head.

NOTE: The contact point for the oscilloscope varies from one model to another, so to find the correct point for your model, refer to the figure entitled "Test point for tape path adjustment" in the electrical circuit section of the service manual.

4. When checking the tape path by eye, use a dental mirror.

4-3-2. LOAD LEVER ASSEMBLY HEIGHT ADJUSTMENT (See Fig.4-3-2)

1. Refer to sections 3-9-2, and remove the opener mounting .
2. Position the height adjustment tool (VHJ-0111) ③ under the full surface of the protrusion ② on the load lever assembly ①, as shown in Fig.4-3-2.
3. Using your fingers, gently screw the adjustment nut ④ clockwise into the nut box (VHJ-0048) ⑤ until the protrusion ② of the load lever assembly ① touches the height adjustment tool (VHJ-0111) ③ and the screw starts to feel tight. Next, loosen the adjustment nut ④ by 270° counterclockwise.
4. Load a cassette tape (NTSC: T-160, PAL: E-240). Wind the tape to the beginning, and repeat FF⟷REV five times (repeat for the same portion 30 to 60 seconds). If the bottom edge of the tape breaks, rotate the adjustment nut ④ in the counterclockwise direction by about 90°. Repeat FF ⟷REV five times again and check that the tape edge does not break (adjust again if it does). Next, repeat CUE⟷REV five times and check that the tape is not damaged. If damaged, rotate the adjustment nut in the clockwise direction by about 90°. Repeat FF⟷REW and CUE ⟷REV and check that the tape is not damaged.

Arrange the equipment so that the whole surface of the projection on the load lever assembly is positioned over the height adjustment tool (VHJ-0111) when seen from directly overhead.

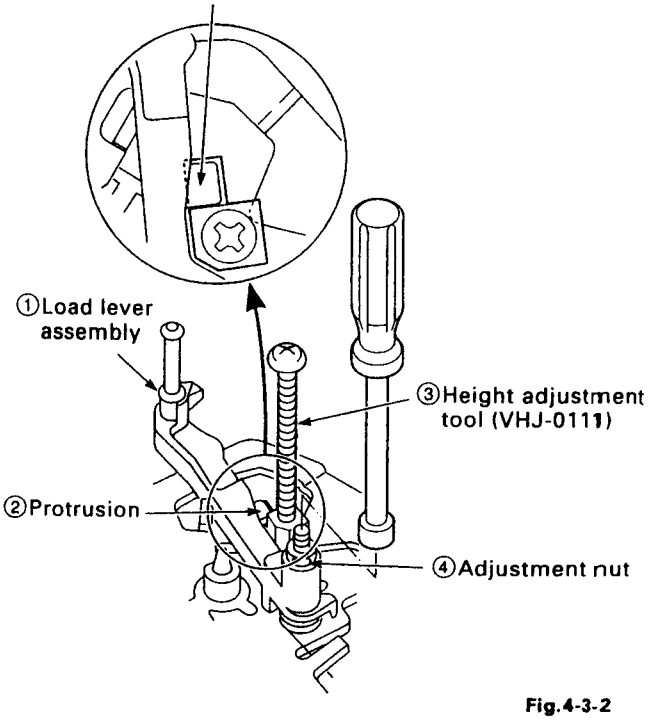


Fig.4-3-2

4-3-3. GUIDE ROLLER HEIGHT ADJUSTMENT (See Figs.4-3-3 and 4-3-4)

1) Playback the Alignment Tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is at its maximum at the tracking centre. Then, after loosening the S guide roller and the T guide roller by rotating them counterclockwise, tighten them in turn until the envelope waveform becomes flat. If the envelope waveform is not at its maximum at the tracking centre, refer to section 4-3-4 and carry out a rough adjustment of the horizontal position of the audio R/P head (ACE head) before adjusting the guide rollers.
2) Adjust the S guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button, and check whether, when the envelope waveform has reached 50% of its maximum, the front half of the envelope waveform is flat. If not, fine-tune the S guide roller as follows.
   a. If the front half of the envelope waveform is as shown in Fig.4-3-4 (a), this means that you have pressed the S guide roller too far. Therefore, loosen it slightly, and when it is in the state shown in Fig.4-3-4 (b), tighten it again, stopping when the envelope waveform is flat.
   b. If the front half of the envelope waveform is as shown in Fig.4-3-4 (b), this means you have not pressed the S guide roller far enough. Therefore, tighten it slightly, stopping when the envelope waveform becomes flat.
   c. If the front half of the envelope waveform is as shown in Fig.4-3-4 (c), it may happen that when you tighten the S guide roller, the wrapper waveform does not disappear, but sinks into the flat part, as shown in Fig.4-3-4 (d). If this happens, the status shown in Fig.4-3-4 (c) is normal, so loosen the S guide roller, then tighten it again until the envelope waveform is as shown in Fig.4-3-4 (c).
   ② Check that at the tracking centre, the output of the front half of the envelope waveform is not less than 80% of the maximum.
   ③ Rotate the S guide roller 20° counterclockwise.
3) Adjust the T guide roller.
   ① Playback the alignment tape (NTSC: VSJ-1001, PAL: VHJ-0052). Press the tracking (–) button and check whether, when the envelope waveform is 50% of maximum, the back half of the envelope waveform is flat. If not, loosen the T guide roller slightly, then tighten it gradually until the back half of the envelope waveform becomes flat.
   ② Check that the output for the back half of the envelope waveform is at its maximum at the tracking centre.
4) Check that the envelope waveform does not fluctuate when you switch from CUE to PLAY or from REV to PLAY. If the front half of the envelope waveform does fluctuate, tighten the S guide roller 1° to 20°. If the back half of the envelope waveform does fluctuate, repeat steps 3) and 4).

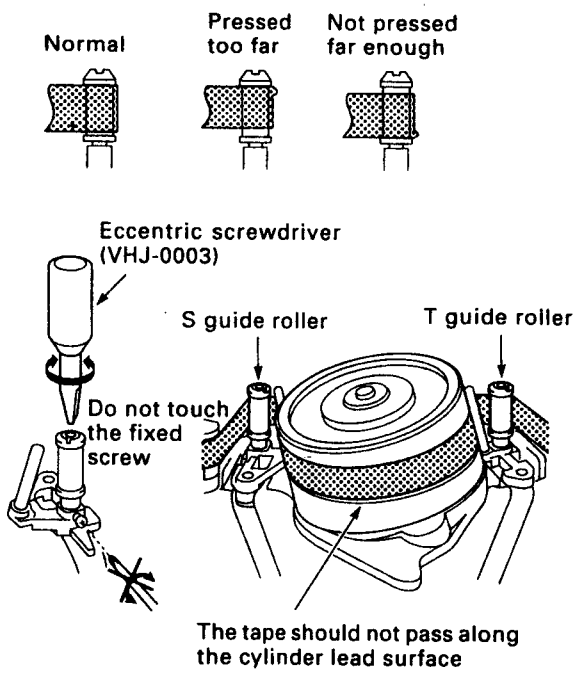

Normal
Pressed too far
Not pressed far enough
Eccentric screwdriver (VHJ-0003)
S guide roller
T guide roller
Do not touch the fixed screw
The tape should not pass along the cylinder lead surface

Fig.4-3-3

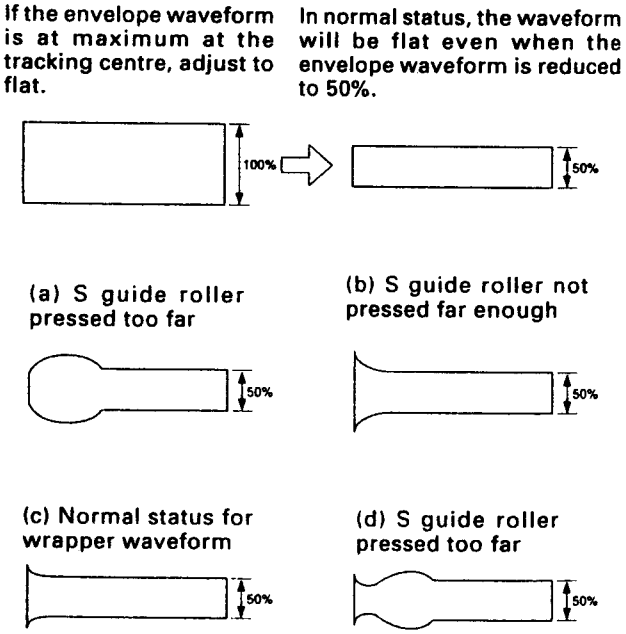

If the envelope waveform is at maximum at the tracking centre, adjust to flat.
In normal status, the waveform will be flat even when the envelope waveform is reduced to 50%.
100%
50%
(a) S guide roller pressed too far
(b) S guide roller not pressed far enough
(c) Normal status for wrapper waveform
(d) S guide roller pressed too far

Fig.4-3-4

4-3-4. AUDIO R/P HEAD (ACE HEAD) HEIGHT ADJUSTMENT, AZIMUTH ADJUSTMENT AND HORIZONTAL POSITION ADJUSTMENT

(1) Hight/azimuth adjustment (See Fig.4-3-5)

1) Refer to section 4-3-3, complete the GUIDE ROLLER adjustment, and perform the AUDIO R/P HEAD adjustment.
   As the audio R/P head assembly (ACE HEAD) has been temporarily adjusted before shipment, do not rotate screws unnecessarily.
2) Mark screw Ⓐ, screw Ⓑ, and bracket with a waterproof marker so that their original positions can be known even after the screws are rotated.
   Marking screws Ⓐ and Ⓑ in the same direction will enable the adjustment mentioned later to be performed easily.
3) Play the adjustment tape (NTSC:VHJ-0005, PAL:VHJ-0008), and observe the audio output waveform using an oscilloscope.
   Loosen screw Ⓑ in the counterclockwise direction to decrease the audio output level. Then tighten it in the clockwise direction until the maximum level. Tighten further in the clockwise direction to decrease the level, and loosen in the counterclockwise direction until the maximum level.
4) Rotate screw Ⓐ in the same direction by the same degree as screw Ⓑ in step 1. (Check visually according to the mark made.)
5) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (temporary azimuth adjustment).
6) Perform the adjustments in 3) to 5) again.
7) Perform fine adjustments using screw Ⓑ.
   Perform the same adjustments as 3), and if screw Ⓑ was adjusted by more than 30 degrees, perform the adjustment in step 4) again, and then perform fine adjustments.
8) Play the adjustment tape (NTSC:VHJ-0006, PAL:VHJ-0009), rotate screw Ⓒ, and maximize the audio output waveform (actual azimuth adjustment).

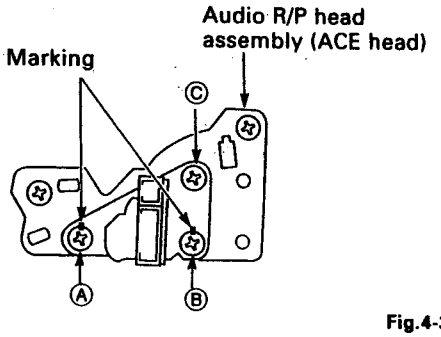


Fig.4-3-5

(2) Horizontal position adjustment (See Fig.4-3-6)

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009).
2) Press the tracking buttons (tracking + and tracking –) simultaneously and set the tracking to the centre.
3) Using an oscilloscope, observe the waveform of the video head output.
4) Loosen the two fixed screws on the audio R/P head (ACE head) by between 20° and 30° anticlockwise.
5) Using a slotted screwdriver, adjust the position of the audio R/P head (ACE head). At the position where the amplitude of the envelope waveform is at its maximum at the tracking centre, tighten the fixed screw on the audio R/P head (ACE head). When you do this, check that the envelope waveform changes equally whether the tracking is shifted by pressing the tracking button in the plus or the minus direction.
6) Play the alignment tape (NTSC: VSJ-1001 PAL: VHJ-0052) and check that the amplitude of the envelope waveform is at its maximum at the tracking centre. If not, repeat steps 1) to 6).
7) Refer to the electrical adjustments section of the service manual, and adjust the switching position of the servo circuit.

NOTE:

1. When you press the tracking buttons (tracking + and tracking –) simultaneously, the tracking is reset to the tracking centre. When the tracking is at the tracking centre, the message "T - : - " will appear in place of the clock display on the front panel. If you keep pressing the tracking – button the messages "T -: " and "T - -: " will appear, while if you keep pressing the tracking + button, the messages "T : -" and "T : - - " will appear. Three seconds after you stop pressing the tracking buttons, the clock display will re-appear.
2. The check described in paragraph 6) is not necessary for models in which the only tape speed is SP mode.

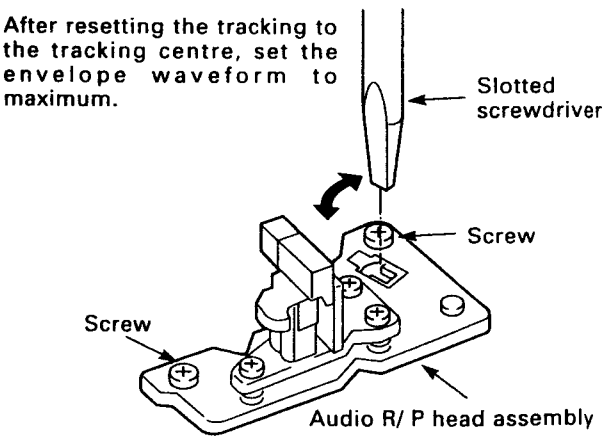

After resetting the tracking to the tracking centre, set the envelope waveform to maximum.
Slotted screwdriver
Screw
Screw
Audio R/ P head assembly

Fig.4-3-6

4-3-5.CHECKING AFTER ADJUSTMENT

1) Play the alignment tape (NTSC: VHJ-0006, PAL: VHJ-0009) and check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform.
2) Load a cassette tape (NTSC: T-120, PAL: E-180) and use it to record and replay. Check that the envelope waveform is activated immediately and that there are no fluctuations in the envelope waveform or the audio output waveform. (When recording on the tape, input 1kHz to the audio input terminal. Use a scratch-free cassette tape (NTSC: T-120, PAL: E-180).) Check that at the tracking centre, the front half down and back half down are not more than 20% of the value at the point where the envelope waveform amplitude is at its maximum.
3) Check that the envelope waveform is activated immediately when you switch from PLAY to REV or from REV to PLAY. Check that there is no slack in the tape next to the pinch roller.
4) Check that the envelope waveform is activated immediately when you switch to PLAY from FF, REW, CUE, REV or STOP mode. Check that there is no slack in the tape next to the pinch roller.
5) Check that the tape is not curling or riding up on the upper or lower flanges of the tape guides in PLAY, FF, REW, CUE or REV modes.
6) Check that in PLAY mode, the tape runs as shown in Fig.4-3-7.
7) Load a tape (NTSC: T-160, PAL: E-240) and play it back. carry out the checks described in steps 3) to 5) above.

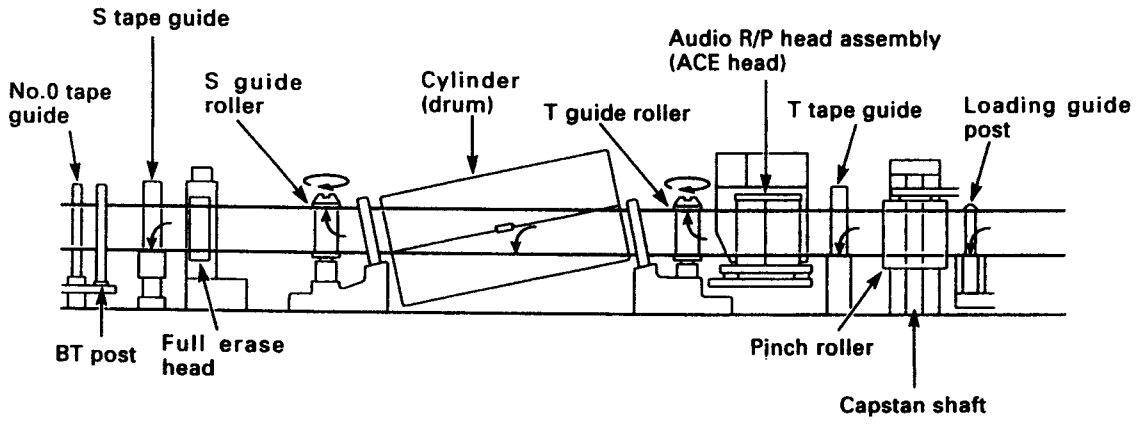


Fig.4-3-7

SECTION 4
ELECTRICAL ADJUSTMENTS

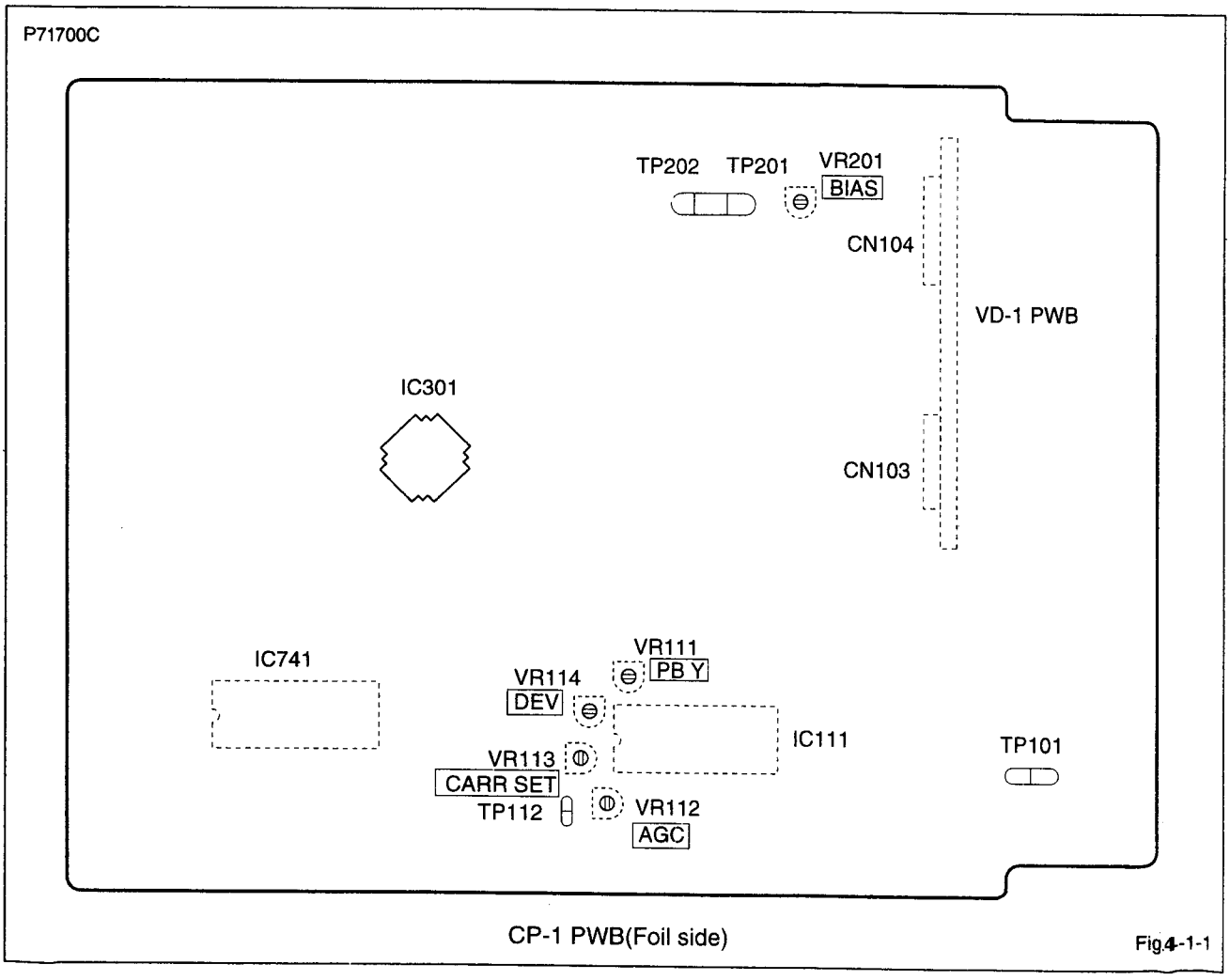
4-1. SERVO CIRCUIT ADJUSTMENT

●These adjustments should be carried out upon completion of the tape transport adjustments.
●If the tape transport abjustments (except thetilt abjustment) are done after these abjustments,follow the procedures again in section 4-1-3. "switching position adj."
●When a cassette tape is loaded,auto-tracking will be set immediately after starting the first playback.As this will deviate the tracking center set,be sure to press tracking buttons (+) or (−) once directly after starting playback to prevent auto-tracking from being set.

4-1-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Color Bar Signal Generator	PAL color bar signal with 100% white level (EBU color bar signal)
Oscilloscope	Vertical sensitivity : 5 mV/DIV, external trigger Band width : more than 10 MHz
Alignment Tape	VHJ-0009 : SP mode
Blank Tape	VHS-tape cassette tape
Monitor TV	

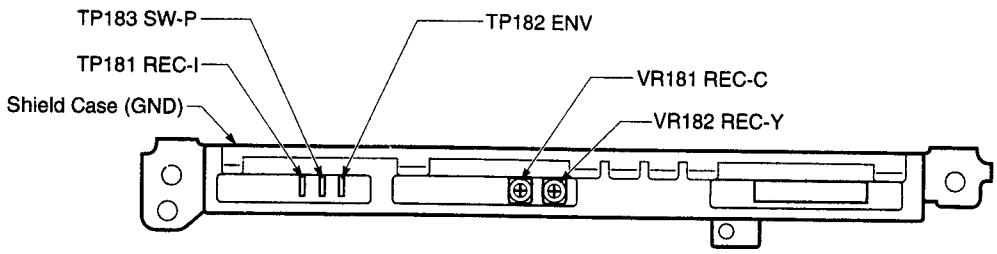
4-1-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB(Foil side)

Fig.4-1-1

P1B71800A



VP-1 PWB Assembly

Fig.4-1-2

NOTES :

- Set the REC/PLAY SPEED button to indicator panel to the 8H (8 hours) mode.
- Self-recoding means "Record any broadcasting or video signal and play back the just-recorded portion"

4-1-3. SWITCHING POSITION ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP101 (VIDEO OUT) TP183 (SW-P)	Oscilloscope	PLAY(SP)mode Alignment tape VHJ-0009

Adj.Condition	Adj.Condition
REC button TRACKING (+, −) button EJECT button	6.5 H ± 0.5 H

1. Play back the alignment tape,and set the tracking control position to the center by pressing TRACKING buttons (+) and (−) simultaneously.
2. Press the REC button three times within 10 seconds after the display is shown.All three presses must be carried out within 2 seconds.For the third time,press the REC button more than 0.5 seconds as shown in Fig.4-1-3.
3. The automatic adjustment mode is set,the numerals of Indicator display "P:0:00" chages automatically and the unit stops at the point the adjustment value becomes approx. 6.5 H.
4. In the same abjustment mode,trigger at the falling edge of the RF SW pulse,and check that the front edge of the V sync signal from the rising edge of the RF SW pulse is delayed by 6.5H ± 0.5H as shown in Fig.4-1-4. If it is not 6.5H ±0.5H,manually perform fine ajdustments for the TRACKING buttons (+) or (−) to satisfy the specification.
5. After completing adjustments,press the EJECT button (more than 1 second) and check the Indicator shows "P − : −" at this time.

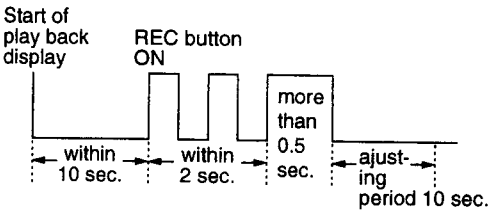


Fig.4-1-3

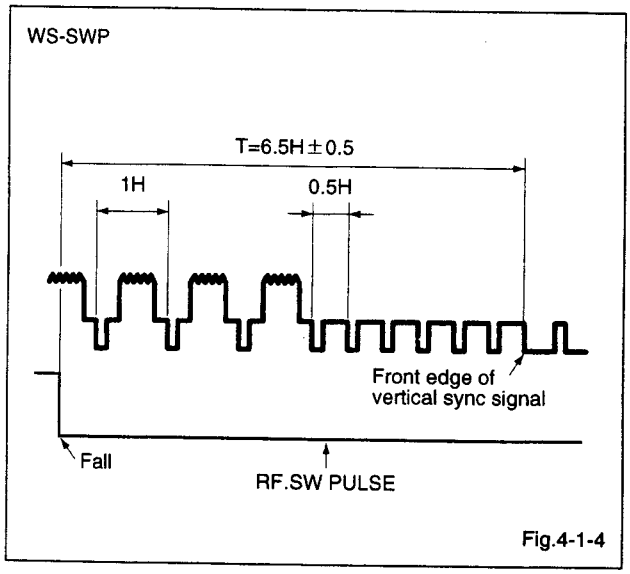


Fig.4-1-4

NOTE : Repeat steps 1 to 4 if the adjustment takes more then 10 seconds.

4-1-4. F. SLOW SERVO TRACKING ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
Picture of monitor	Monoscope pattern	Self-recording (SP mode) F. Slow mode

Adj.Location	Adj.Value
TRACKING (+)or(−)button	—

1. Play back the own recorded portion andt then set the VCR in the still mode.
2. Change to F. Slow play back mode by pressing MENU RESET button more than 1 second.
3. Set the tracking control position to the center by pressing TRACKING (+)and(−)buttons simultaneously, and confirm the absence of noise in the slow playback image on the monitor screen at this centered tracking position.
   Starting from this centered tracking position, push the (+)and(−)buttons and confirm that no noise appears before the fith push in either direction.
   If noise appears before the fifth push, fine-tune with the front tracking adjustment button so that no noise appears before the fifth push, then press the REC button to make this point the new tracking center. (When pressing the REC button to enter this new tracking center, the tracking should be displayed.)
   The FLD counter readout changes to "P − : −" for approximately one second in order to confirm that data has been entered.

4-2. VIDEO CIRCUIT ADJUSTMENT

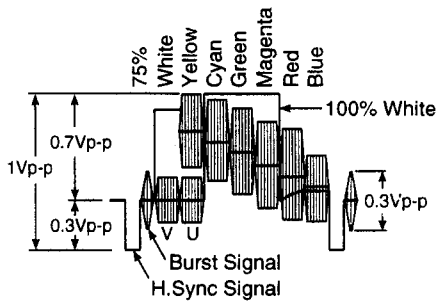
Before making the following adjustments, complete the adjustments described in section 4-1. "Servo Circuit."

4-2-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Color Bar Signal Generator	PAL color bar signal with 100% white level (EBU color bar signal)	
Frequency Counter	Input frequency	: 20 Hz~10 MHz
Oscilloscope	Vertical sensitivity Bandwidth	: 5 mV/DIV, external trigger : more than 10 MHz
Oscilloscope Probe	Input capacity Covering frequency	: less than 25 pF (10:1) less than 40 pF (1:1) : DC~40 MHz (10:1) DC~30 MHz (10:1)
Alignment Tape	VHJ-0008 (Color bar signal waveform is described below. Refer to Fig. 4-2-1.)	: SP mode, color bar,1 kHz
Blank Tape	VHS-type cassette tape	
Alignment Relay Jig	VHJ-0066	: 7-wire flat cable for VP-1 PWB assembly
Extension cord	VHJ-0109	: Connect VD-1 PWB to CP-1 PWB

ALIGNMENT TAPE COLOR BAR SIGNAL

WPV-TCS



Color bar signar waveform(VHJ-0008)

WPV-TCP

	White	Yellow	Cyan	Green	Magenta	Red	Blue
(75%) →							
	V	U	100% White			Black	

Color bar patterm(VHJ-0008)on monitor TV

Fig.4-2-1

ADJUSTMENT RELAY JIG

Connect the flat cable end from the cylinder assembly to the VP-1 PWB assmbly using the relay jig to provide simple repairing or adjustment of the VP-1 PWB assembly,as shown in Fig. 4-2-3.Further,when adjusting the VP-1 PWB assembly,be sure to make contact an end of shield case with bracket of the VP-1 PWB assembly to maintain the shield effect.If the VP-1 PWB assembly does not contact,there is insufficient ground and no proper play back image can be obtained.

WNV-EP4Q/U2

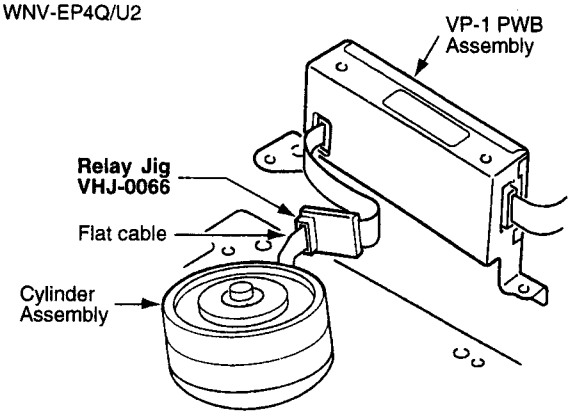


Fig.4-2-3

EXTENSION CORD (VHJ-0109)

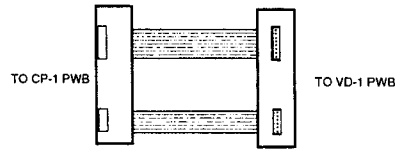
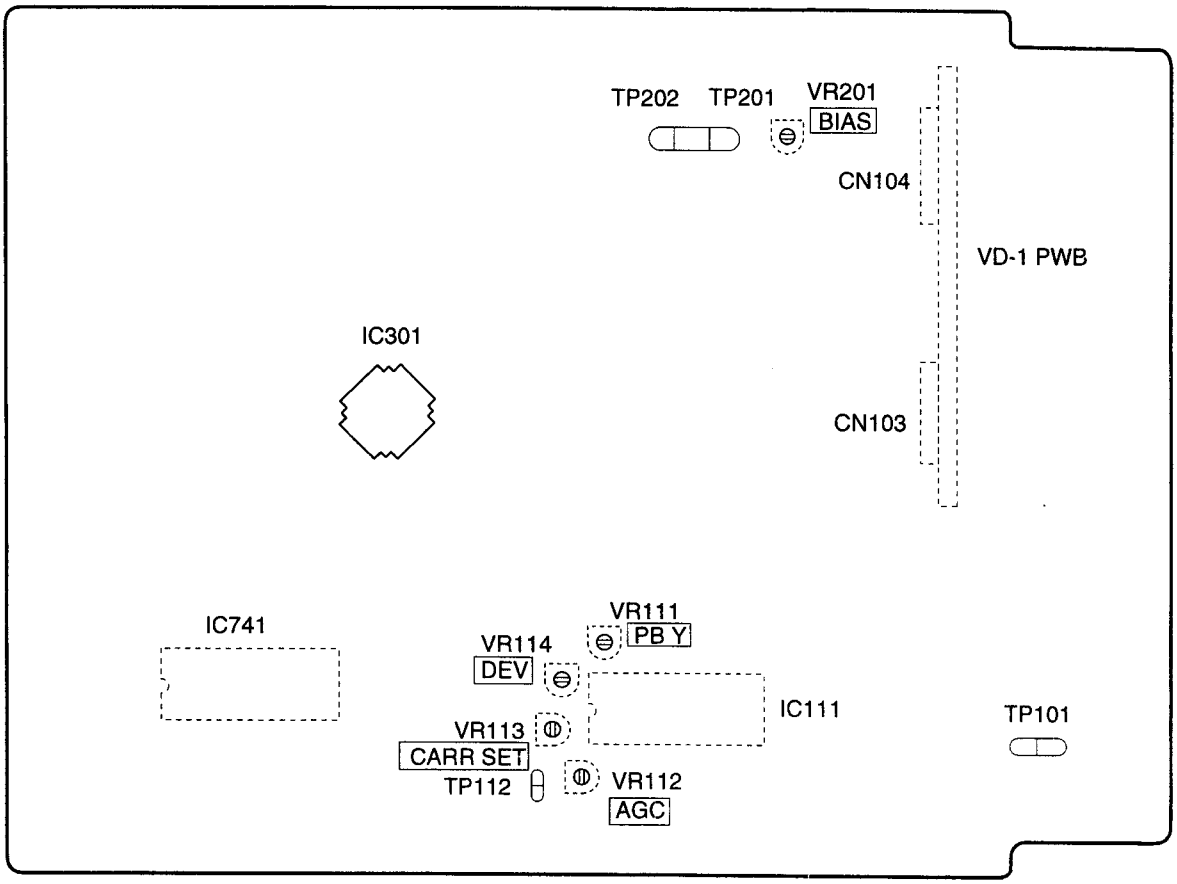


Fig.4-2-2

4-2-2. LOCATION OF TEST POINTS

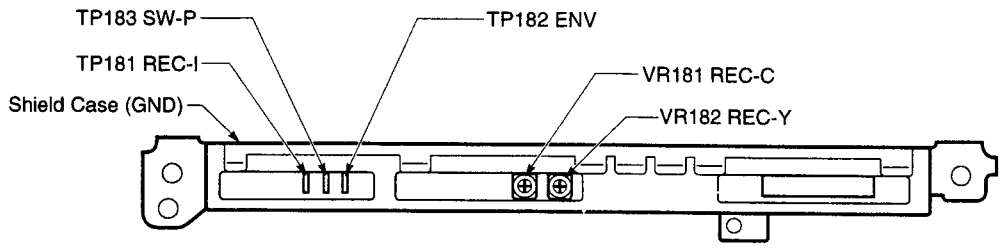
P71700C



CP-1 PWB(Foil side)

Fig.4-2-4

PIB71800A



VP-1 PWB Assembly

Fig.4-2-6

NOTE:

Self-recording weans "Record the video signal and playback the just-recorded portion."

4-2-3. AGC LEVEL ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP101 (VIDEO OUT)	Color bar generator Oscilloscope (10:1 probe)	E-E mode

Adj.Location	Adj.Value
VR112 (AGC)	1 Vp-p ± 0.03 Vp-p

1.Terminate TP101 and ground with a 75Ω resistor,and connect the color bar generator to the VIDEO IN terminal.
2.Adjust VR112 (AGC) for 1Vp-p ± 0.03Vp-p as shown in Fig. 4-2-7.

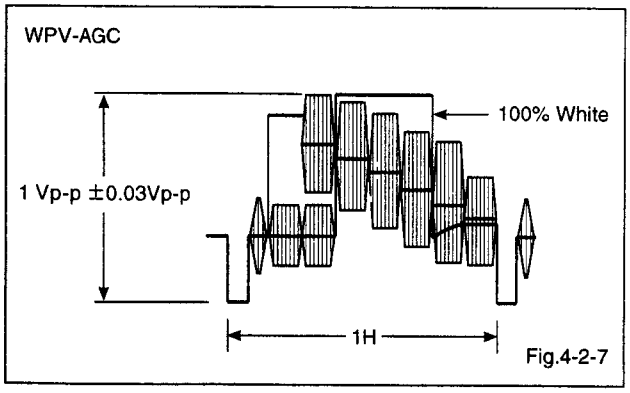


Fig.4-2-7

4-2-4. PB-Y LEVEL ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP101 (VIDEO OUT)	Oscilloscope	PLAY (3H)mode Alignment tape VHJ-0008

Adj.Location	Adj.Value
VR111 (PB-Y)	1Vp-p ±0.03Vp-p

1.Terminate TP101 and ground with a 75Ω resistor.
2.Play back Alignment tape in 3H mode.
3.Adjust VR111 (PB-Y) for the video luminance signal level of 1Vp-p ±0.03Vp-p. (Refer to Fig. 4-2-8)

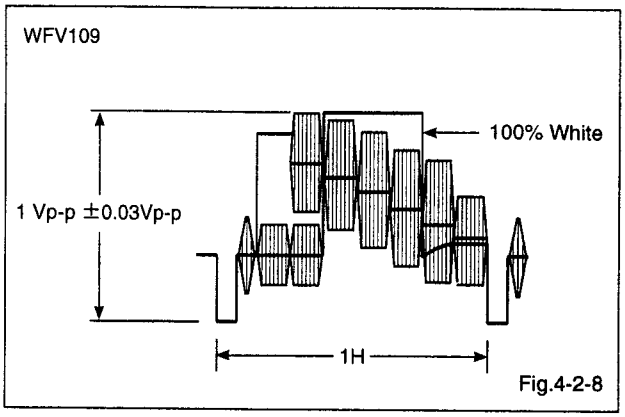


Fig.4-2-8

4-2-5. CARRIER SET ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP112	Color bar generator Frequency counter	REC (3H) mode

Adj.Location	Adj.Value
VR113 (CAR)	4MHz ±0.03MHz

1.Connect the color bar generator to the VIDEO IN terminal.
2.After removing the first color bar signal input from the VIDEO IN terminal,immediately adjust VR113 (CAR) so that the frequency becomes 4MHz ±0.03MHz.

4-2-6. DEVIATION ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP101 (VIDEO OUT)	Color bar generator Oscilloscope	Self-recording (3H) mode Blank tape

Adj.Location	Adj.Value
VR114 (DEV)	1Vp-p ±0.02Vp-p

1.Record the color bar signal on the blank tape.
2.Play back of the just-recorded portion.
3.Adjust VR114 (DEV) for 1 Vp-p ± 0.02 Vp-p as shown in Fig. 4-2-10.
4.If the adjustment value is not satisfactory,adjust VR114 (DEV) and repeat steps 1 to 3.

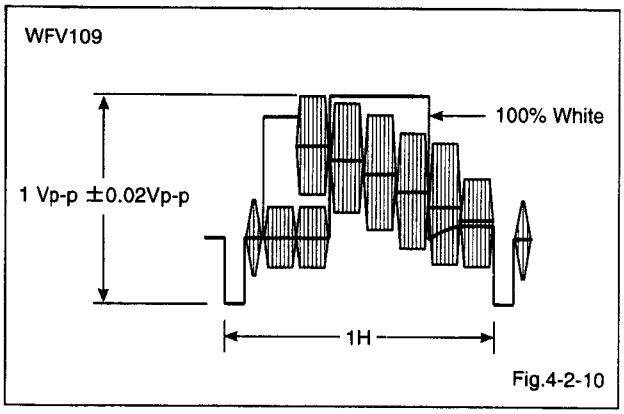


Fig.4-2-10

4-2-7. C REC CURRENT ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP181 (on VP-1 PWB)	Color bar generator Oscilloscope (1:1 probe)	REC (3H) mode Blank tape

Adj.Location	Adj.Value
VR181(REC-C)	170mVp-p ±10mVp-p

1.Connect the ground of the oscilloscope to the shield case of the VP-1 PWB assembly.
2.Adjust VR 182 so that the video luminance signal level is ZERO.
3.Connect the color bar generator to the VIDEO IN terminal.
4.Adjust VR181 (REC-C) so that the video luminance signal level is 170mVp-p ±10mVp-p.(Refer to Fig. 4-2-11)

NOTE: Adjust it after ORC is turned off at the time of the one with the ORC fanction.
Push the TRACKING (+) button with pushing STOP to turn off ORC.

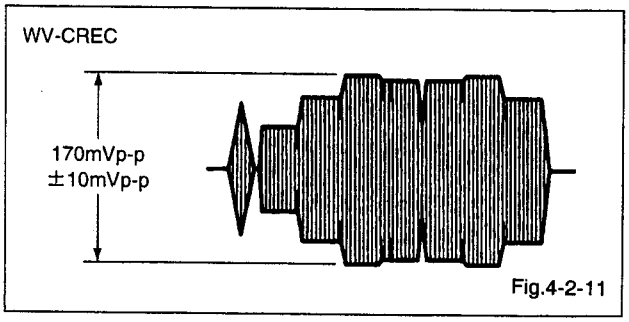


Fig.4-2-11

4-2-8. Y REC CURRENT ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP181 (on VP-1 PWB)	Color bar generator Oscilloscope (1:1 probe)	REC (3H) mode Blank tape

Adj.Location	Adj.Value
VR182(REC-Y)	650mVp-p ±20mVp-p

1.Connect the ground of the oscilloscope to the shield case of the VP-1 PWB assembly.
2.Connect the color bar generator to the VIDEO IN terminal.
3.Adjust VR182(REC-Y) so that the video luminance signal level is 650mVp-p ±20mVp-p.(Refer to Fig. 4-2-12)

NOTE: Adjust it after ORC is turned off at the time of the one with the ORC fanction.
Push the TRACKING + button with pushing STOP to turn off ORC.

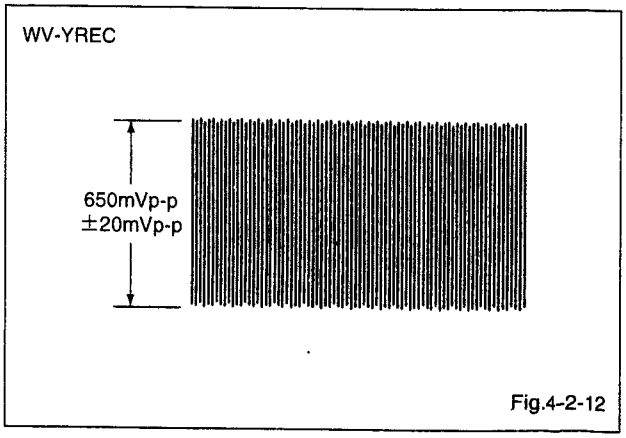


Fig.4-2-12

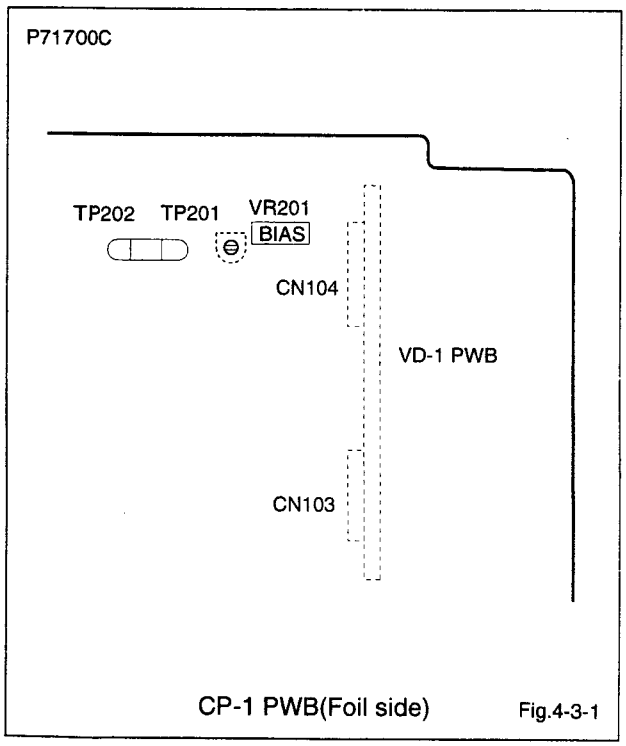
4-3. AUDIO CIRCUIT ADJUSTMENT

●Before making these adjustments,(except the ACE heads adjustments), be sure to make the adjustments described in section 4-1. "Servo Circuit." and section 4-2. "Video Circuit."

4-3-1. TEST EQUIPMENT AND STANDARDS REQUIRED

Color Bar Signal Generator	PAL color bar signal with 100% white level (EBU color bar signal)
Oscilloscope	Vertical sensitivity : 5 mV/DIV Bandwidth : more than 30 MHz
AC Voltmeter	Effective value indication Input frequency : 10 Hz~20 kHz Input impedance : more than 1 MΩ Measurement level : 1 mV (full scale)
Frequency Counter	Input frequency : 20 Hz~10 MHz
Blank Tape	VHS-type cassette tape

4-3-2. LOCATION OF ADJUSTMENT POINTS



CP-1 PWB(Foil side) Fig.4-3-1

NOTE :

●Set the following switch to the positions indicator below,before making following adjustments.

SWITCH	POSITION
REC/PLAY SPEED	3H

4-3-3. BIAS LEVEL ADJ.

Measuring Point	Measuring Equipment	Adj.Condition
TP201 (HOT) TP202 (COLD)	Color bar generator Oscilloscope AC voltmeter Frequency counter	REC mode Blank tape

Adj.Location	Adj.Value
VR201(BIAS)	21 mVrms

1.Connect the color bar generator to the VIDEO IN terminal.

2.Load the VCR with a blank tape and select the record mode without all incoming signal.

3.After confirming on the oscilloscope that a 70kHz ±5 kHz sine wave is being output, adjust VR201 (BIAS) so that the AC voltmeter's reading is 21 mVrms.

4-4. TEST POINTS FOR TAPE PATH ADJUSTMENT

Test points TP182 (ENV) and TP183 (SW-P) for tape path adjustment are shown in figure below.

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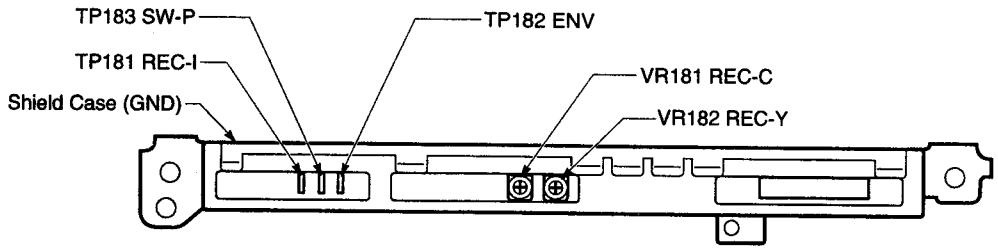


VP-1 PWB Assembly

Fig.4-4-1

SECTION 5
EXPLODED VIEWS

5-1. NOTES ON REPAIR PARTS

(1) Safety Related Components Warning
Components marked ⚠ are critical to safe operation. Therefore, specified parts should be used in the case of replacement.

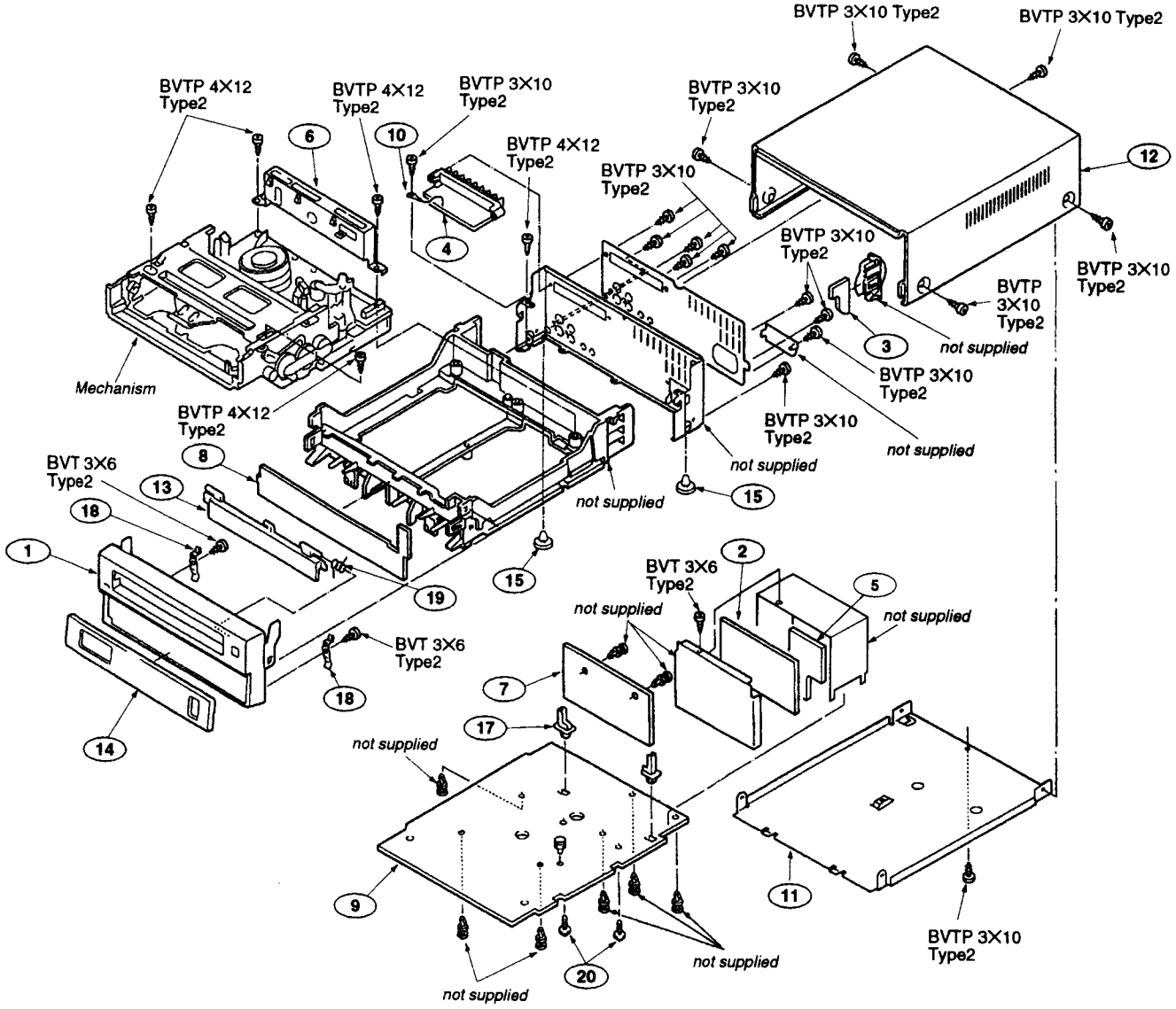
(2) Standardization of Parts
Repair parts supplied from Sony Parts Center may not be always identical with the parts which actually in use due to "accommodating the improved parts and/or engineering changes" or "standardization of genuine parts".
This manual's exploded views and electrical spare parts list are indicating the part numbers of "the standardized genuine parts at present".

(3) Stock of Parts
Parts marked with "o" SP (Supply Code) column of the spare parts list are not normally required for routine service work. Orders for parts marked with "o" will be processed, but allow for additional delivery time.

(4) Units for Capacitors, Inductors and Resistors
The following units are assumed in schematic diagrams, electrical parts list and exploded views unless otherwise specified.

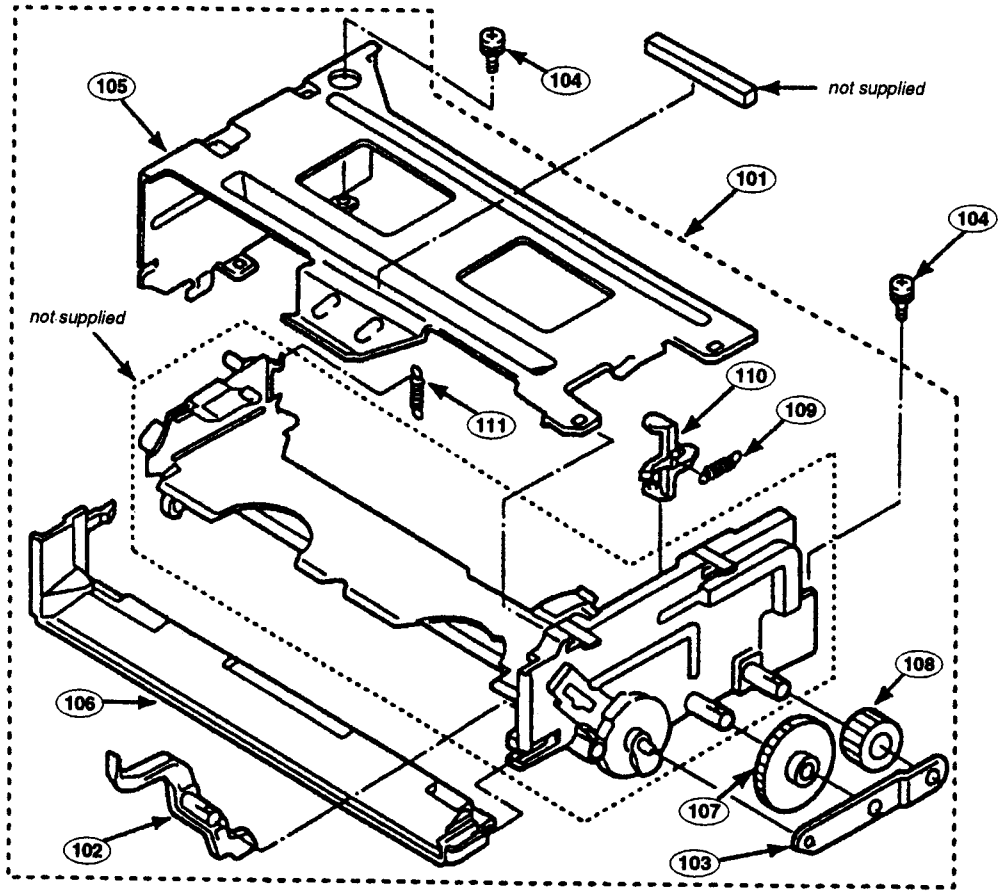
Capacitors : μF
Inductors : μH
Resistors : Ω

5-2. EXPLODED VIEWS



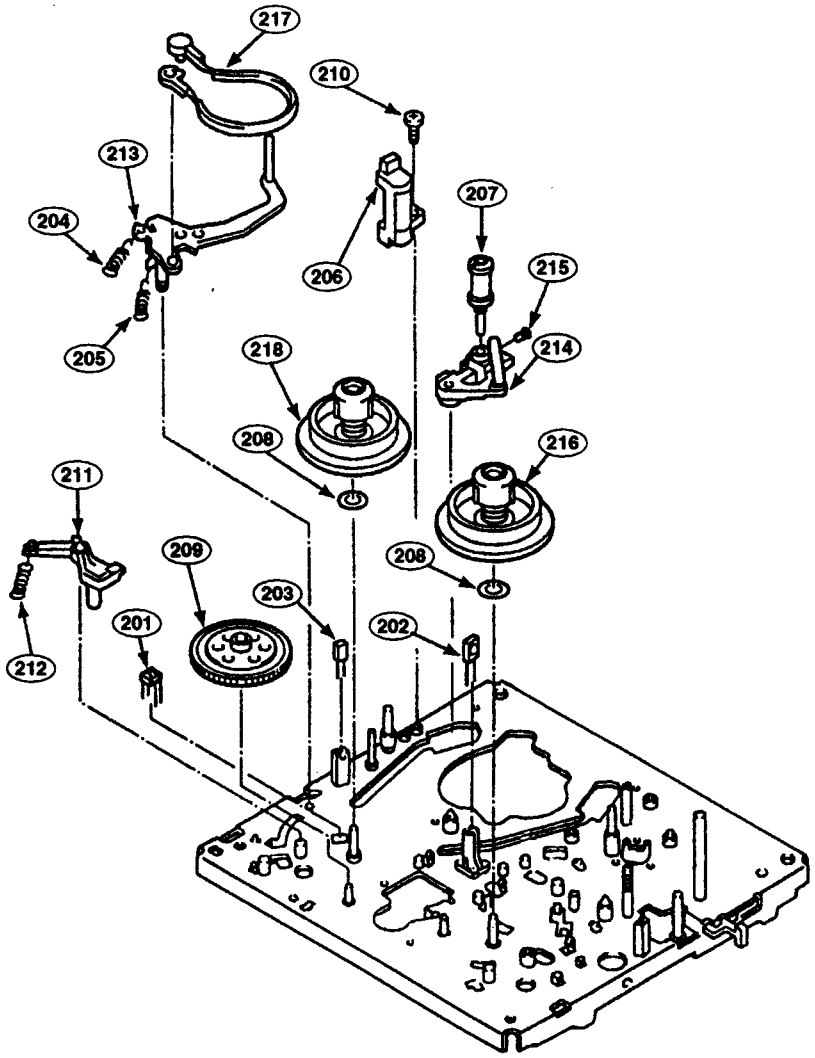
No.	Part No.	SP	Description
1	A-8317-977-A	s	CABINET ASSY, FRONT
2	A-8317-057-A	o	MOUNTED CIRCUIT BOARD, PW-1
3	A-8317-982-A	o	MOUNTED CIRCUIT BOARD, TB-5
4	A-8317-983-A	o	MOUNTED CIRCUIT BOARD, TB-1
5	A-8317-059-A	o	MOUNTED CIRCUIT BOARD, TB-6
6	A-8317-056-A	o	MOUNTED CIRCUIT BOARD, VP-1
7	A-8317-058-A	o	MOUNTED CIRCUIT BOARD, VD-1
8	A-8315-782-A	o	MOUNTED CIRCUIT BOARD, TM-1
9	A-8317-061-A	o	MOUNTED CIRCUIT BOARD, CP-A
10	1-769-188-11	s	CORD, TERMINAL

No.	Part No.	SP	Description
11	3-193-641-01	o	COVER, BOTTOM
12	3-193-643-01	o	COVER, TOP
13	3-194-199-01	s	DOOR, CASSETTE
14	3-193-659-01	s	DOOR
15	3-194-041-01	s	STAND
16	3-747-603-01	s	FIXER
17	3-940-518-01	o	HOLDER (NAP PWB)
18	3-947-420-01	s	SPRING, PLATE
19	3-960-936-01	s	SPRING
20	3-965-446-01	s	SCREW, SPECIAL

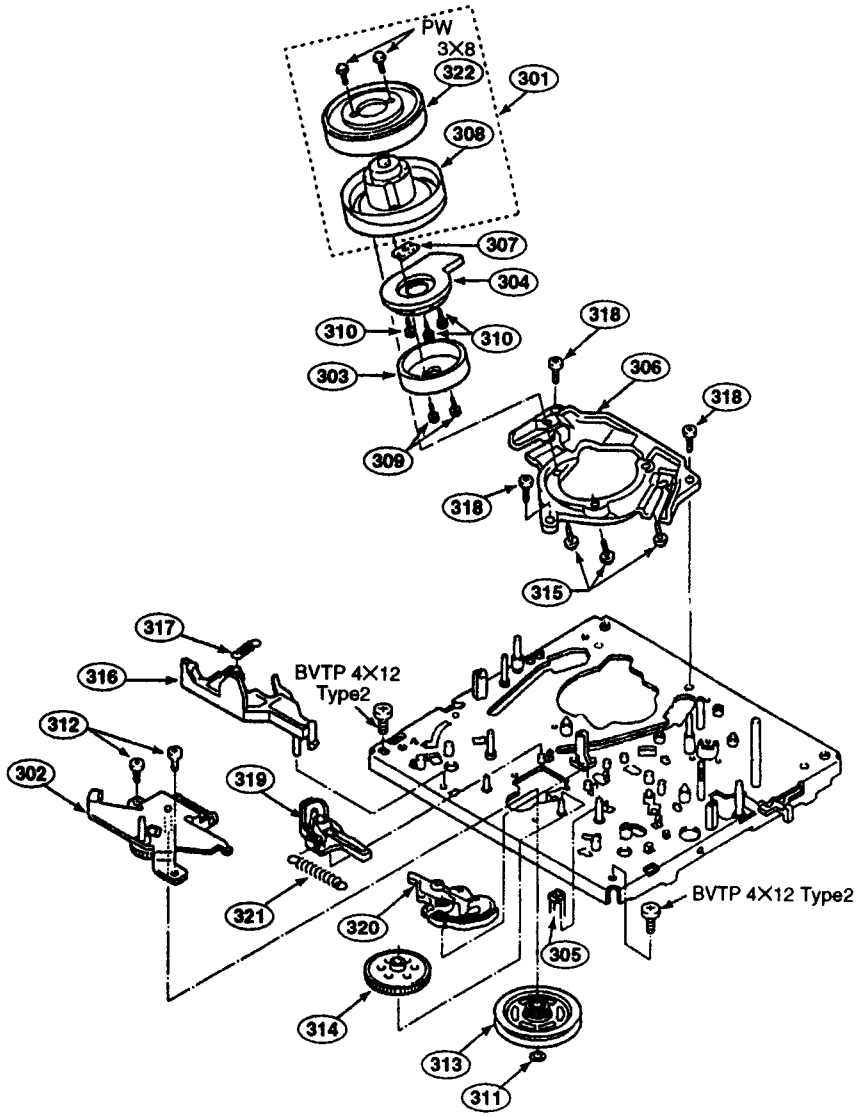


No.	Part No.	SP	Description
101	A-6779-276-A	o	MECHANICAL ASSY, CASSETTE
102	3-960-915-01	s	LEVER, DOOR OPENER
103	3-960-916-01	o	HOLDER, GEAR
104	3-960-939-01	s	SCREW (2.6X6), SPECIAL
105	3-960-952-01	o	STAND (L)
106	3-960-954-01	s	FRAME, UNDER
107	3-960-959-01	s	GEAR, LOCK
108	3-960-960-01	s	GEAR, PINION
109	3-961-301-01	s	SPRING, LID OPENER
110	3-961-302-01	s	LEVER, RELEASE
111	3-961-303-01	s	SPRING, LOCK TRAY

MECHANISM DECK SECTION2

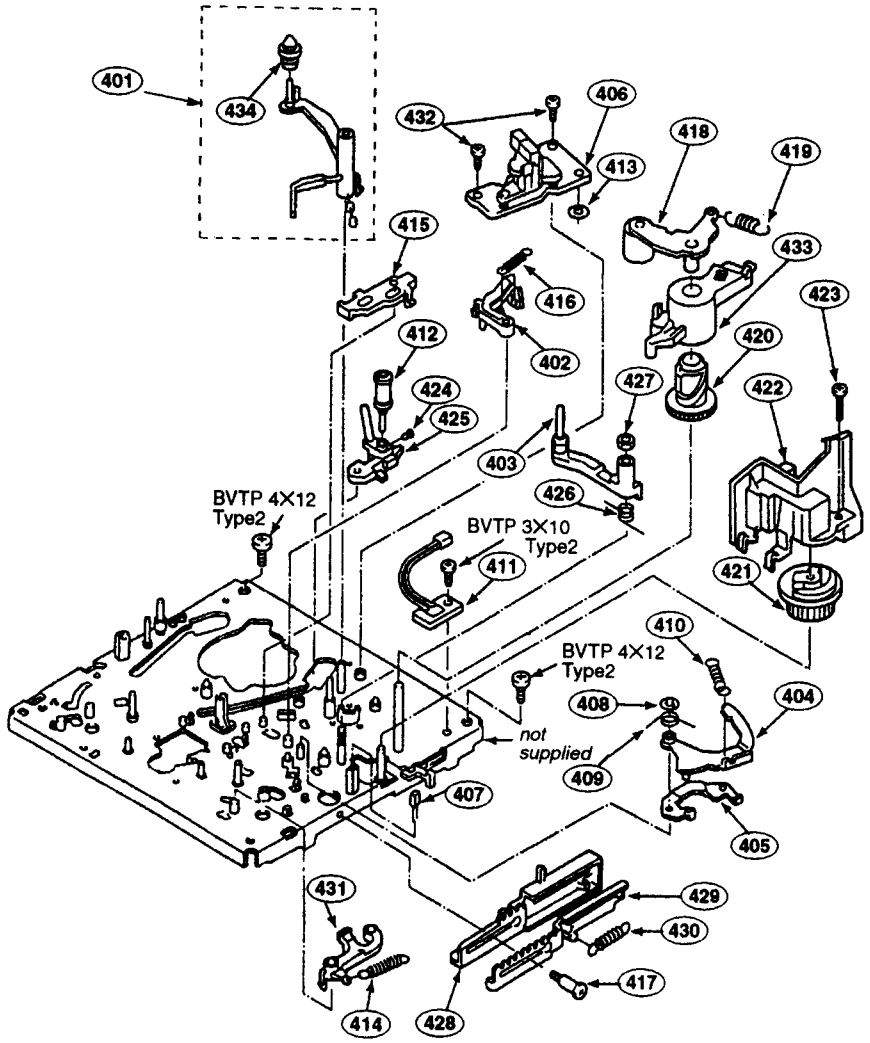


No.	Part No.	SP	Description
201	1-801-326-11	s	PHOTO COUPLER SG-105F
202	1-810-690-11	s	LED LN59L
203	1-810-691-11	s	PHOTO DIODE PN263L-NC
204	3-193-650-01	s	SPRING, BT (TL)
205	3-193-651-01	s	SPRING, BT SUB (TL)
206	3-193-669-01	s	HEAD, ERASE (FULL)
207	3-735-630-01	s	ROLLER ASSY, GUIDE
208	3-735-754-01	s	WASHER (DIA.3), ADJUSTMENT
209	3-960-927-01	s	GEAR, S REEL
210	3-960-984-01	s	SCREW (2.6X10), SPECIAL
211	3-961-002-01	s	LEVER, S SOFT
212	3-961-003-01	s	SPRING, S SOFT
213	3-961-016-01	s	LEVER ASSY, BT
214	3-961-037-01	s	MOUNT ASSY, S INC LINE
215	3-961-038-01	s	SCREW (2X3), SPECIAL
216	3-963-782-01	s	REEL (ASSY), TAKE UP
217	3-963-789-01	s	BAND (ASSY), BRAKE
218	3-977-065-01	s	REEL, SUPPLY (ASSY)



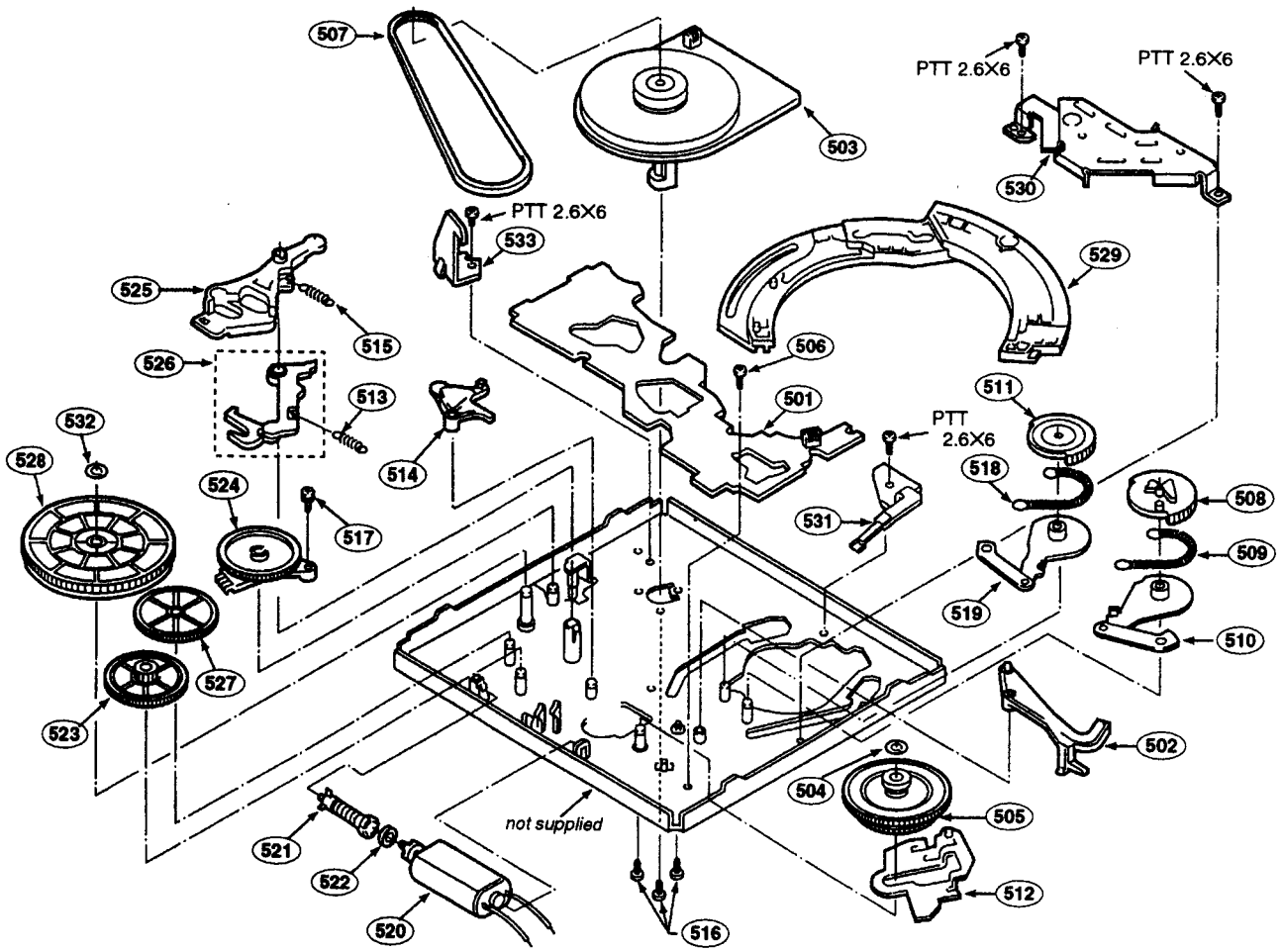
No.	Part No.	SP	Description
301	A-8311-884-A	o	COMPLETE PWB, CYLINDER
302	A-8316-756-A	s	MOUNT (COMPLETE PWB) ASSY
303	1-698-912-11	s	MOTOR, ROTOR CYL DC 2W
304	1-698-913-11	s	MOTOR, STATOR CYL DC 2W
305	1-801-326-11	s	PHOTO COUPLER SG-105F
306	3-193-652-01	s	CYLINDER, MOUNTING
307	3-949-898-01	s	SPACER, MOTOR
308	3-746-722-11	s	CYLINDER (LWR 4)
309	3-746-760-01	s	SCREW (2.3X6), SPECIAL
310	3-746-761-01	s	SCREW (2.3X10), SPECIAL
311	3-948-603-01	s	WASHER, SPECIAL
312	3-960-925-01	s	SCREW (2.6X4), SPECIAL
313	3-960-926-01	s	PULLEY, REEL
314	3-960-928-01	s	GEAR, T REEL
315	3-960-980-01	s	SCREW (2.6X7), SPECIAL
316	3-961-022-01	s	LEVER, EP SWITCH
317	3-961-023-01	s	SPRING, EP SWITCH
318	3-961-034-01	s	SCREW (2.6X8), SPECIAL
319	3-963-785-01	s	BRAKE (ASSY), S
320	3-963-786-01	s	BRAKE (ASSY), T
321	3-966-765-01	s	SPRING, BRAKE
322	3-191-497-11	s	CYLINDER (UPR 2NP4-Q0)

MECHANISM DECK SECTION4



No.	Part No.	SP	Description
401	A-6779-889-A	s	LEVER ASSY
402	A-8315-818-A	s	BRAKE ASSY, CAPSTAN (TL)
403	A-8315-819-A	s	ROAD (TL) ASSY, LEVER
404	A-8315-820-A	s	GUIDE (TL) ASSY, LEVER (ACTL)
405	A-8315-821-A	s	STOPPER (TL) ASSY, LEVER
406	A-8315-823-A	s	ACE ASSY, HEAD (R/P)
407	1-810-691-11	s	PHOTO DIODE PN263L-NC
408	3-193-570-01	s	SLIT, 2.6X8X0.50 WASHER
409	3-193-648-01	s	SPRING, ACTL GUIDE (TL)
410	3-193-649-01	s	SPRING, STOPPER (TL)
411	3-193-670-01	s	SENSOR, R SPECIAL DEW
412	3-735-630-01	s	ROLLER ASSY, GUIDE
413	3-735-760-01	s	WASHER (DIA.3), SPECIAL
414	3-961-001-01	s	SPRING, T SOFT
415	3-961-008-01	s	SLIDE, T ACT BRAKE
416	3-961-015-01	s	SPRING, CAPSTAN BRAKE
417	3-961-021-01	s	SCREW (2.6X6), SPECIAL

No.	Part No.	SP	Description
418	3-961-024-01	S	LEVER ASSY, PINCH ROLLER
419	3-961-026-01	S	SPRING PINCH ROLLER
420	3-961-027-01	s	CAM, LIFT PINCH
421	3-961-028-01	s	GEAR, CAM PINCH
422	3-961-029-01	s	OPENER MOUNT
423	3-961-030-01	s	SCREW (2.6X16), SPECIAL
424	3-961-038-01	s	SCREW (2X3), SPECIAL
425	3-961-039-01	s	MOUNT ASSY, T INC LINE
426	3-961-044-01	s	SPRING, L GUIDE LEVER
427	3-961-045-01	s	NUT (3X3), SPECIAL
428	3-961-305-01	s	GEAR, FRONT RACK
429	3-961-306-01	s	GEAR, START RACK
430	3-961-307-01	s	SPRING, FRONT RACK
431	3-963-784-01	s	BRAKE (ASSY), SOFT
432	3-966-763-01	s	SCREW (2.6X12)
433	3-973-490-01	S	MOUNT, LIFT PINCH
434	3-977-067-01	s	CLEANER (ASSY)



No.	Part No.	SP	Description
501	A-8315-778-A	o	MOUNTED CIRCUIT BOARD, MC-1
502	A-8315-822-A	s	SPRING (BT TL) ASSY, LEVER
503	1-698-579-11	s	MOTOR, CAPSTAN DC 3W
504	3-735-755-01	s	WASHER (DIA.2.6)
505	3-960-922-01	s	GEAR ASSY, FRICTION
506	3-960-925-01	s	SCREW (2.6X4), SPECIAL
507	3-960-929-01	s	BELT, REEL
508	3-960-995-01	s	GEAR, S ROAD
509	3-960-996-01	s	SPRING, S ROAD
510	3-960-997-01	s	LEVER ASSY, S ROAD
511	3-960-998-01	s	GEAR, T ROAD
512	3-961-007-01	s	SLIDE, S ACT BRAKE
513	3-961-011-01	s	SPRING, BRAKE RETURN
514	3-961-012-01	s	LEVER, CLUTCH CHANGE
515	3-961-013-01	s	SPRING, CLUTCH CHANGE

No.	Part No.	SP	Description
516	3-961-032-01	s	SCREW (2.6X6), SPECIAL
517	3-961-034-01	s	SCREW (2.6X8), SPECIAL
518	3-961-035-01	s	SPRING, T ROAD
519	3-961-036-01	s	LEVER ASSY, T ROAD
520	3-961-047-01	s	MOTOR ASSY, LOADING
521	3-961-048-01	s	GEAR (COMPL), WORM
522	3-961-049-01	s	DAMPER
523	3-961-050-01	s	GEAR (1), WHEEL
524	3-963-780-01	s	SWITCH (P-IT), MODE
525	3-963-787-01	s	LEVER, CONTROL BRAKE
526	3-963-788-01	s	BAR (ASSY), ACT BRAKE LEVER
527	3-963-793-01	s	GEAR (2), WHEEL
528	3-963-794-01	s	CAM, MAIN
529	3-963-795-01	o	SLIDE, CRESCENT
530	3-963-796-01	s	MOUNT, CRESCENT
531	3-970-879-01	s	GROUND (ASSY), CYL
532	3-973-491-01	s	WASHER (3.6X0.5), SPECIAL
533	3-974-757-01	s	RETAINER, CAPSTAN

5-3. ELECTRICAL PARTS LIST

CP-A BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-008-A	o	MOUNTED CIRCUIT BOARD, CP-A

The CP-A board includes the AD-A, PW-A, SV-A, TM-A and VD-A boards.

AD-A BOARD

C2003	1-124-257-00	s	ELECT 2.2uF 20% 50V
C2004	1-111-241-11	s	ELECT 10uF 20% 16V
C2005	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C2006	1-162-207-31	s	CERAMIC 22PF 5% 50V
C2009	1-124-234-00	s	ELECT 22uF 20% 16V
C2010	1-124-589-11	s	ELECT 47uF 20% 16V
C2013	1-163-023-00	s	CERAMIC, CHIP 0.015uF 10% 50V
C2016	1-124-259-11	s	ELECT 4.7uF 20% 50V
C2017	1-111-241-11	s	ELECT 10uF 20% 16V
C2019	1-124-589-11	s	ELECT 47uF 20% 16V
C2020	1-162-286-31	s	CERAMIC 220PF 10% 50V
C2021	1-110-363-11	s	POLYD, 6800PF 100V
C2022	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C2024	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C2030	1-111-241-11	s	ELECT 10uF 20% 16V
C2031	1-124-464-11	s	ELECT 0.22MF 20% 50V
C2033	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C2051	1-164-086-11	s	CERAMIC 0.0012uF 10% 50V
C2072	1-124-229-00	s	ELECT 33uF 20% 10V
C2073	1-124-465-00	s	ELECT 0.47uF 20% 50V
C2074	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C2081	1-124-589-11	s	ELECT 47uF 20% 16V
C2082	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C2091	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C2092	1-161-327-00	s	CERAMIC 0.0033uF 30% 50V
C2101	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C2111	1-111-241-11	s	ELECT 10uF 20% 16V
C2112	1-126-154-11	s	ELECT 47uF 20% 6.3V
C2113	1-111-241-11	s	ELECT 10uF 20% 16V
C2114	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C2115	1-111-241-11	s	ELECT 10uF 20% 16V
C2117	1-111-241-11	s	ELECT 10uF 20% 16V
C2118	1-162-294-31	s	CERAMIC 0.001uF 10% 50V
C2119	1-162-294-31	s	CERAMIC 0.001uF 10% 50V
D2054	8-719-991-33	s	DIODE 1SS133T-77
D2055	8-719-991-33	s	DIODE 1SS133T-77
D2056	8-719-991-33	s	DIODE 1SS133T-77
IC201	1-810-497-11	s	IC LA7285M-TRM
IC211	1-801-984-11	s	IC LA6458D
L2001	1-500-128-11	s	CORE, FERRITE
L2002	1-410-087-31	s	INDUCTOR 10mH
L2003	1-410-491-11	s	INDUCTOR 560uH
Q2001	1-810-471-11	s	TR 2SC3331-S-AA
Q2002	1-801-806-11	s	TRANSISTOR DTC144EK
Q2003	8-729-901-05	s	TRANSISTOR DTA124EK
Q2004	1-801-806-11	s	TRANSISTOR DTC144EK
Q2010	1-801-806-11	s	TRANSISTOR DTC144EK
Q2011	1-801-806-11	s	TRANSISTOR DTC144EK
Q2012	1-801-806-11	s	TRANSISTOR DTC144EK

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q2051	8-729-920-31	s	TRANSISTOR DTC343TK
R2001	1-216-025-00	s	METAL, CHIP 100 5% 1/10W
R2002	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R2003	1-216-028-00	s	METAL, CHIP 130 5% 1/10W
R2004	1-216-109-00	s	METAL, CHIP 330K 5% 1/10W
R2005	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2009	1-216-121-00	s	METAL, CHIP 1M 5% 1/10W
R2010	1-208-810-11	s	METAL, CHIP 15K 0.50% 1/10W
R2011	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2012	1-208-810-11	s	METAL, CHIP 15K 0.50% 1/10W
R2013	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R2014	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W
R2018	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R2021	1-216-013-00	s	METAL, CHIP 33 5% 1/10W
R2022	1-216-017-00	s	METAL, CHIP 47 5% 1/10W
R2023	1-208-810-11	s	METAL, CHIP 15K 0.50% 1/10W
R2024	1-216-311-00	s	METAL, CHIP 6.8 5% 1/10W
R2025	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2026	1-216-071-00	s	METAL, CHIP 8.2K 5% 1/10W
R2035	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2037	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2038	1-216-063-00	s	METAL, CHIP 3.9K 5% 1/10W
R2042	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R2050	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R2051	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2071	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R2092	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R2101	1-216-091-00	s	METAL, CHIP 56K 5% 1/10W
R2102	1-208-810-11	s	METAL, CHIP 15K 0.50% 1/10W
R2105	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R2106	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R2111	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R2112	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2113	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2114	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R2115	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R2116	1-216-025-00	s	METAL, CHIP 100 5% 1/10W
R2117	1-216-689-11	s	METAL, CHIP 39K 0.5% 1/10W
R2118	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R2119	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
RY201	1-755-140-11	s	RELAY
T2001	1-433-370-11	s	TRANSFORMER, OSC
VR201	1-228-997-00	s	RES, ADJ, METAL 100K

PW-A BOARD

2pcs	1-533-583-11	s	HOLDER, FUSE
1pc	3-194-193-01	o	COVER, FUSE
C5410	1-104-666-11	s	ELECT 220uF 20% 25V
C5411	1-164-159-21	s	CERAMIC 0.1uF 50V
CN546	⚠1-750-692-11	s	SOCKET (AC INLET)
D5410	8-719-300-45	s	DIODE EM-1Z

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
F5401	⚠1-532-297-00	s	FUSE, 2.5A, 250V
IC541	8-759-513-72	s	IC PQ12RF11
R5402	⚠1-202-724-00	s	COMP 2.7M 10% 1/2W
R5410	1-249-429-11	s	CARBON 10K 5% 1/4W
VA541	⚠1-801-123-11	s	VARISTOR ENC4710D-05AS6

SV-A BOARD

C3001	1-162-209-31	s	CERAMIC 27pF 5% 50V
C3002	1-162-207-31	s	CERAMIC 22PF 5% 50V
C3003	1-162-207-31	s	CERAMIC 22PF 5% 50V
C3004	1-162-207-31	s	CERAMIC 22PF 5% 50V
C3005	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3006	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3007	1-162-286-31	s	CERAMIC 220PF 10% 50V
C3008	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3009	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3011	1-163-009-11	s	CERAMIC, CHIP 0.001uF 10% 50V
C3012	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3013	1-102-824-00	s	CERAMIC 470PF 5% 50V
C3014	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3015	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3016	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3018	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3020	1-126-301-11	s	ELECT 1uF 20% 50V
C3021	1-126-529-11	s	ELECT 0.47uF 20% 50V
C3022	1-109-889-11	s	ELECT 1uF 20% 50V
C3023	1-109-889-11	s	ELECT 1uF 20% 50V
C3024	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3025	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3026	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3028	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3029	1-161-061-11	s	CERAMIC 0.068uF 10% 50V
C3031	1-161-061-11	s	CERAMIC 0.068uF 10% 50V
C3032	1-162-211-31	s	CERAMIC 33PF 5% 50V
C3033	1-162-211-31	s	CERAMIC 33PF 5% 50V
C3034	1-162-211-31	s	CERAMIC 33PF 5% 50V
C3035	1-101-884-00	s	CERAMIC 56PF 5% 50V
C3036	1-101-884-00	s	CERAMIC 56PF 5% 50V
C3037	1-101-884-00	s	CERAMIC 56PF 5% 50V
C3038	1-126-916-11	s	ELECT 1000uF 20% 6.3
C3039	1-124-234-00	s	ELECT 22uF 20% 16V
C3040	1-126-176-11	s	ELECT 220uF 20% 10V
C3041	1-124-234-00	s	ELECT 22uF 20% 16V
C3042	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3043	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3044	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3045	1-111-241-11	s	ELECT 10uF 20% 16V
C3050	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3054	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3055	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3056	1-124-465-00	s	ELECT 0.47uF 20% 50V
C3057	1-163-017-00	s	CERAMIC, CHIP 0.0047uF 5% 50V
C3058	1-126-301-11	s	ELECT 1uF 20% 50V
C3059	1-163-017-00	s	CERAMIC, CHIP 0.0047uF 5% 50V

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C3060	1-126-301-11	s	ELECT 1uF 20% 50V
C3061	1-126-154-11	s	ELECT 47uF 20% 6.3V
C3062	1-102-973-00	s	CERAMIC 100PF 5% 50V
C3063	1-102-973-00	s	CERAMIC 100PF 5% 50V
C3064	1-124-234-00	s	ELECT 22uF 20% 16V
C3065	1-124-234-00	s	ELECT 22uF 20% 16V
C3066	1-126-176-11	s	ELECT 220uF 20% 10V
C3067	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3069	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3070	1-111-241-11	s	ELECT 10uF 20% 16V
C3073	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3075	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3076	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3078	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3090	1-126-935-11	s	ELECT 470uF 20% 16V
C3091	1-102-978-00	s	CERAMIC 220PF 5% 50V
C3101	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3102	1-124-257-00	s	ELECT 2.2uF 20% 50V
C3120	1-126-155-11	s	ELECT 100uF 20% 6.3
C3121	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C3122	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C3130	1-163-009-11	s	CERAMIC, CHIP 0.001uF 10% 50V
D3001	8-719-912-20	s	DIODE 1SS120
D3002	1-809-070-11	s	DIODE AK04-V2
D3004	8-719-901-83	s	DIODE 1SS83
D3005	8-719-912-20	s	DIODE 1SS120
D3008	8-719-109-89	s	DIODE RD5.6ES-B2
D3009	8-719-109-89	s	DIODE RD5.6ES-B2
D3010	8-719-912-20	s	DIODE 1SS120
D3011	8-719-912-20	s	DIODE 1SS120
D3012	8-719-912-20	s	DIODE 1SS120
D3013	8-719-912-20	s	DIODE 1SS120
D3014	8-719-929-15	s	DIODE MTZJ-T-77-9.1B
D3015	8-719-109-89	s	DIODE RD5.6ES-B2
D3016	8-719-912-20	s	DIODE 1SS120
D3020	8-719-901-83	s	DIODE 1SS83
D3030	8-719-912-20	s	DIODE 1SS120
D3031	8-719-912-20	s	DIODE 1SS120
D3091	8-719-912-20	s	DIODE 1SS120
D3101	8-719-901-83	s	DIODE 1SS83
IC302	1-810-787-11	s	IC MN1381-H
IC303	8-759-353-59	s	IC LB1643
IC304	1-808-716-11	s	IC LA7116
IC305	1-801-467-11	s	IC X24C02PC7189
IC306	1-801-356-11	s	IC MN1381-R
IC308	1-803-026-11	s	IC TC4030BP TSB
Q3001	8-729-205-97	s	TRANSISTOR SC4483-R
Q3002	8-729-205-97	s	TRANSISTOR SC4483-R
Q3003	8-729-205-97	s	TRANSISTOR SC4483-R
Q3004	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q3005	8-729-205-97	s	TRANSISTOR SC4483-R
Q3010	1-801-806-11	s	TRANSISTOR DTC144EK
Q3091	8-729-205-97	s	TRANSISTOR SC4483-R
Q3101	1-801-806-11	s	TRANSISTOR DTC144EK
Q3102	8-729-901-04	s	TRANSISTOR DTA114EK
R3001	1-216-109-00	s	METAL, CHIP 330K 5% 1/10W
R3002	1-216-119-00	s	METAL, CHIP 820K 5% 1/10W

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R3003	1-216-083-00	s	METAL, CHIP 27K 5% 1/10W
R3004	1-216-107-00	s	METAL, CHIP 270K 5% 1/10W
R3005	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R3006	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R3007	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3008	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3009	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3010	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3011	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3012	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3013	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3014	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3016	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3017	1-216-078-00	s	METAL 16K 5% 1/10W
R3018	1-216-078-00	s	METAL 16K 5% 1/10W
R3020	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3021	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3023	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R3024	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R3026	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3027	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R3028	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R3029	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R3031	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3033	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R3034	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3036	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R3037	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3038	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3039	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3040	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3041	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3042	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3043	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R3044	1-249-415-11	s	CARBON 680 5% 1/4W
R3045	1-249-415-11	s	CARBON 680 5% 1/4W
R3046	1-216-109-00	s	METAL, CHIP 330K 5% 1/10W
R3053	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R3055	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3056	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3057	1-216-067-00	s	METAL, CHIP 5.6K 5% 1/10W
R3058	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3059	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R3060	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3061	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R3062	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R3063	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3064	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3065	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3066	1-216-105-00	s	METAL, CHIP 220K 5% 1/10W
R3067	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3068	1-216-105-00	s	METAL, CHIP 220K 5% 1/10W
R3069	1-249-413-11	s	CARBON 470 5% 1/4W
R3070	1-249-415-11	s	CARBON 680 5% 1/4W
R3071	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3073	1-216-109-00	s	METAL, CHIP 330K 5% 1/10W
R3074	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3075	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3077	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R3078	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3079	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3080	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R3083	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R3084	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R3085	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3086	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3087	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3091	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R3092	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R3093	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3094	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3095	1-216-064-00	s	METAL, CHIP 4.3K 5% 1/10W
R3096	1-216-064-00	s	METAL, CHIP 4.3K 5% 1/10W
R3097	1-216-064-00	s	METAL, CHIP 4.3K 5% 1/10W
R3098	1-249-409-11	s	CARBON 220 5% 1/4W
R3099	1-249-409-11	s	CARBON 220 5% 1/4W
R3101	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R3102	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W
R3103	1-216-059-00	s	METAL, CHIP 2.7K 5% 1/10W
R3104	⚠1-212-946-11	s	FUSIBLE 3.3 5% 1/2W
R3105	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3106	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3120	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3121	1-216-089-00	s	METAL, CHIP 47K 5% 1/10W
R3122	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R3123	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3126	1-249-412-11	s	CARBON 390 5% 1/4W
R3127	1-249-403-11	s	CARBON 68 5% 1/4W
R3128	1-249-403-11	s	CARBON 68 5% 1/4W
R3130	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R3131	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R3140	1-249-409-11	s	CARBON 220 5% 1/4W
R3150	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
X3001	1-579-220-11	s	CRYSTAL, OSC (32kHZ)
X3002	1-767-200-11	s	CRYSTAL OSC

TM-A BOARD

1pc	3-966-191-01	o	HOLDER, FL
BZ751	1-529-113-11	s	BUZZER, PIEZO CB13PA-X5
C7302	1-163-009-11	s	CERAMIC, CHIP 0.001uF 10% 50V
C7305	1-163-009-11	s	CERAMIC, CHIP 0.001uF 10% 50V
C7403	1-124-589-11	s	ELECT 47uF 20% 16V
C7404	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C7408	1-102-973-00	s	CERAMIC 100PF 5% 50V
C7411	1-162-291-31	s	CERAMIC 560pF 10% 50V
C7412	1-162-291-31	s	CERAMIC 560pF 10% 50V
C7413	1-162-291-31	s	CERAMIC 560pF 10% 50V
C7414	1-162-291-31	s	CERAMIC 560pF 10% 50V
D7430	8-719-901-83	s	DIODE 1SS83
D7436	8-719-991-33	s	DIODE 1SS133T-77
D7438	8-719-991-33	s	DIODE 1SS133T-77
D7444	8-719-991-33	s	DIODE 1SS133T-77
IC741	1-801-355-11	s	IC MN12510

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q7301	8-729-920-28	s	TRANSISTOR FMG9
Q7302	8-729-920-28	s	TRANSISTOR FMG9
Q7303	8-729-902-96	s	TRANSISTOR FMS1
Q7502	8-729-027-43	s	TRANSISTOR DTC114EK-T96
R7306	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R7312	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R7316	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R7320	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R7335	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R7336	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R7337	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R7338	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R7347	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R7348	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R7349	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R7350	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R7402	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R7403	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R7404	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R7405	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R7406	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R7407	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R7408	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R7409	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R7414	1-216-093-11	s	METAL 68k 5% 1/10W
R7415	1-216-093-11	s	METAL 68k 5% 1/10W
R7416	1-216-093-11	s	METAL 68k 5% 1/10W
R7417	1-216-093-11	s	METAL 68k 5% 1/10W
R7418	1-216-093-11	s	METAL 68k 5% 1/10W
R7419	1-216-097-00	s	METAL, CHIP 100K 5% 1/10W
R7420	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R7514	1-249-411-11	s	CARBON 330 5% 1/4W
X7401	1-233-491-11	s	CERAMIC OSC 4.000MHZ

VD-A BOARD

C1001	1-111-241-11	s	ELECT 10uF 20% 16V
C1002	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1004	1-124-525-11	s	ELECT 1000uF 20% 25V
C1005	1-124-589-11	s	ELECT 47uF 20% 16V
C1006	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1008	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1009	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1010	1-126-301-11	s	ELECT 1uF 20% 50V
C1013	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1014	1-126-301-11	s	ELECT 1uF 20% 50V
C1015	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1016	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1017	1-102-973-00	s	CERAMIC 100PF 5% 50V
C1018	1-102-973-00	s	CERAMIC 100PF 5% 50V
C1019	1-102-973-00	s	CERAMIC 100PF 5% 50V
C1020	1-162-207-31	s	CERAMIC 22PF 5% 50V
C1021	1-162-207-31	s	CERAMIC 22PF 5% 50V
C1022	1-162-201-31	s	CERAMIC 12PF 5% 50V
C1023	1-162-201-31	s	CERAMIC 12PF 5% 50V
C1024	1-124-259-11	s	ELECT 4.7uF 20% 50V
C1101	1-162-201-31	s	CERAMIC 12PF 5% 50V

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C1102	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1103	1-124-465-00	s	ELECT 0.47uF 20% 50V
C1104	1-162-195-31	s	CERAMIC 4.7pF 10% 50V
C1105	1-102-822-00	s	CERAMIC 390PF 5% 50V
C1106	1-162-195-31	s	CERAMIC 4.7pF 10% 50V
C1107	1-162-280-31	s	CERAMIC 82PF 10% 50V
C1108	1-111-241-11	s	ELECT 10uF 20% 16V
C1109	1-111-241-11	s	ELECT 10uF 20% 16V
C1110	1-162-219-31	s	CERAMIC 68pF 5% 50V
C1111	1-124-465-00	s	ELECT 0.47uF 20% 50V
C1112	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1113	1-161-055-00	s	CERAMIC 0.022uF 10% 50V
C1114	1-162-287-31	s	CERAMIC 270PF 10% 50V
C1115	1-126-301-11	s	ELECT 1uF 20% 50V
C1116	1-126-301-11	s	ELECT 1uF 20% 50V
C1117	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1118	1-161-055-00	s	CERAMIC 0.022uF 10% 50V
C1119	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1120	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C1121	1-161-057-00	s	CERAMIC 0.033uF 10% 25V
C1123	1-124-257-00	s	ELECT 2.2uF 20% 50V
C1124	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1125	1-126-301-11	s	ELECT 1uF 20% 50V
C1126	1-161-055-00	s	CERAMIC 0.022uF 10% 50V
C1127	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1128	1-111-241-11	s	ELECT 10uF 20% 16V
C1129	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1130	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1131	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1132	1-111-241-11	s	ELECT 10uF 20% 16V
C1133	1-111-241-11	s	ELECT 10uF 20% 16V
C1134	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1140	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C1142	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1143	1-102-953-00	s	CERAMIC 18PF 5% 50V
C1146	1-162-201-31	s	CERAMIC 12PF 5% 50V
C1201	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C1202	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1203	1-162-286-31	s	CERAMIC 220PF 10% 50V
C1204	1-101-884-00	s	CERAMIC 56PF 5% 50V
C1205	1-162-280-31	s	CERAMIC 82PF 10% 50V
C1223	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1225	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1227	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1228	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1301	1-111-241-11	s	ELECT 10uF 20% 16V
C1302	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1303	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1304	1-163-017-00	s	CERAMIC, CHIP 0.0047uF 5% 50V
C1305	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1306	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1307	1-126-301-11	s	ELECT 1uF 20% 50V
C1308	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1309	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1311	1-162-208-31	s	CERAMIC 24pF 5% 50V
C1312	1-162-211-31	s	CERAMIC 33PF 5% 50V
C1313	1-162-203-31	s	CERAMIC 15pF 5% 50V
C1321	1-162-215-31	s	CERAMIC 47PF 5% 50V
C1322	1-101-880-00	s	CERAMIC 47PF 10% 50V

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
C1323	1-164-060-11	s	CERAMIC 39PF 5% 50V
C1328	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1329	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1415	1-161-057-00	s	CERAMIC 0.033uF 10% 25V
C1501	1-163-009-11	s	CERAMIC, CHIP 0.001uF 10% 50V
C1505	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
D1002	8-719-991-33	s	DIODE 1SS133T-77
D1101	8-719-991-33	s	DIODE 1SS133T-77
D1102	8-719-991-33	s	DIODE 1SS133T-77
D1105	8-719-991-33	s	DIODE 1SS133T-77
D1201	8-719-109-89	s	DIODE RD5.6ES-B2
D1202	8-719-991-33	s	DIODE 1SS133T-77
IC101	1-801-856-11	s	IC LC74781-9660
IC111	1-809-674-11	s	IC LA7395
IC131	1-801-880-11	s	IC TL8849AP
IC151	1-809-584-11	s	IC LA6393D
L1003	1-414-142-11	s	INDUCTOR 1uH
L1004	1-410-514-11	s	INDUCTOR 27uH
L1101	1-410-521-11	s	INDUCTOR 100uH
L1102	1-414-142-11	s	INDUCTOR 1uH
L1143	1-414-142-11	s	INDUCTOR 1uH
L1311	1-410-522-11	s	INDUCTOR 120uH
L1321	1-410-512-11	s	INDUCTOR 18uH
Q1001	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1002	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1003	8-729-101-25	s	TRANSISTOR 2SC1009A
Q1005	8-729-216-22	s	TRANSISTOR 2SA1162
Q1007	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1008	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1009	8-729-216-22	s	TRANSISTOR 2SA1162
Q1018	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1101	1-801-806-11	s	TRANSISTOR DTC144EK
Q1102	1-801-806-11	s	TRANSISTOR DTC144EK
Q1103	1-801-806-11	s	TRANSISTOR DTC144EK
Q1104	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1201	8-729-205-97	s	TRANSISTOR SC4483-R
Q1202	8-729-216-22	s	TRANSISTOR 2SA1162
Q1203	1-801-806-11	s	TRANSISTOR DTC144EK
Q1204	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1213	1-801-806-11	s	TRANSISTOR DTC144EK
Q1214	1-801-806-11	s	TRANSISTOR DTC144EK
Q1311	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1312	8-729-216-22	s	TRANSISTOR 2SA1162
Q1321	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1322	8-729-216-22	s	TRANSISTOR 2SA1162
Q1401	8-729-216-22	s	TRANSISTOR 2SA1162
Q1402	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1501	8-729-901-06	s	TRANSISTOR DTA144EK
R1001	1-216-093-11	s	METAL 68k 5% 1/10W
R1002	1-216-091-00	s	METAL, CHIP 56K 5% 1/10W
R1003	1-216-071-00	s	METAL, CHIP 8.2K 5% 1/10W
R1004	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R1005	1-216-071-00	s	METAL, CHIP 8.2K 5% 1/10W
R1006	1-216-059-00	s	METAL, CHIP 2.7K 5% 1/10W
R1007	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1008	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R1011	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R1012	1-249-417-11	s	CARBON 1K 5% 1/4W
R1013	1-249-417-11	s	CARBON 1K 5% 1/4W
R1014	1-216-022-00	s	METAL, CHIP 75 5% 1/10W
R1017	1-216-022-00	s	METAL, CHIP 75 5% 1/10W
R1018	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1020	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1021	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1022	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1023	1-216-069-11	s	METAL 6.8k 5% 1/10W
R1024	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R1025	1-216-129-00	s	METAL, CHIP 2.2M 5% 1/10W
R1026	1-216-029-00	s	METAL, CHIP 150 5% 1/10W
R1027	1-216-029-00	s	METAL, CHIP 150 5% 1/10W
R1028	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R1101	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R1102	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R1103	1-216-059-00	s	METAL, CHIP 2.7K 5% 1/10W
R1104	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R1105	1-216-059-00	s	METAL, CHIP 2.7K 5% 1/10W
R1106	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R1107	1-216-063-00	s	METAL, CHIP 3.9K 5% 1/10W
R1109	1-216-121-00	s	METAL, CHIP 1M 5% 1/10W
R1110	1-216-071-00	s	METAL, CHIP 8.2K 5% 1/10W
R1111	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R1112	1-208-810-11	s	METAL, CHIP 15K 0.50% 1/10W
R1113	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R1114	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1115	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W
R1116	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1118	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1119	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1120	1-216-021-00	s	METAL, CHIP 68 5% 1/10W
R1122	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R1123	1-216-029-00	s	METAL, CHIP 150 5% 1/10W
R1124	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1125	1-216-677-11	s	METAL, CHIP 12K 0.5% 1/10W
R1126	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R1127	1-216-071-00	s	METAL, CHIP 8.2K 5% 1/10W
R1128	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R1133	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R1134	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1201	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R1202	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R1203	1-216-065-00	s	METAL, CHIP 4.7K 5% 1/10W
R1204	1-216-063-00	s	METAL, CHIP 3.9K 5% 1/10W
R1205	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1206	1-216-053-00	s	METAL, CHIP 1.5K 5% 1/10W
R1228	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1229	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1231	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1232	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1301	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R1302	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1303	1-216-039-00	s	METAL, CHIP 390 5% 1/10W
R1304	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1305	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1311	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1312	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R1313	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W

(CP-A BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R1314	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1321	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1322	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1323	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1324	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1401	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1402	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1403	1-216-295-00	s	METAL, CHIP 0 5% 1/10W
R1501	1-216-109-00	s	METAL, CHIP 330K 5% 1/10W
R1502	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R1503	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R1504	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1505	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1506	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
RY101	1-755-140-11	s	RELAY
VR111	1-228-995-00	s	RES, ADJ, METAL 22K
VR112	1-228-991-00	s	RES, ADJ, METAL 2.2K
VR113	1-228-993-00	s	RES, ADJ, METAL 4.7K
VR114	1-228-994-00	s	RES, ADJ, METAL 10K
X1001	1-760-047-11	s	CRISTAL 17.7MHz
X1101	1-577-667-11	s	CRYSTAL 4.43MHz

MC-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8315-778-A	o	MOUNTED CIRCUIT BOARD, MC-1
C8001	1-164-159-21	s	CERAMIC 0.1uF 50V
R8003	1-249-410-11	s	CARBON 270 5% 1/4W
R8004	1-249-407-11	s	CARBON 150 5% 1/4W
R8005	1-249-410-11	s	CARBON 270 5% 1/4W
S8002	1-762-173-11	s	SWITCH, EP (1P-1T)

PW-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-057-A	o	MOUNTED CIRCUIT BOARD, PW-1
1pc	3-194-196-01	s	SHIELD
1pc	3-194-197-01	s	SHIELD
1pc	7-685-545-19	s	SCREW +BTP 3X6 TYPE2 N-S
1pc	7-685-647-79	s	SCREW +BVTP 3X10 TYPE2 N-S
C5001	⚠1-136-188-11	s	FILM 0.068uF 5% 250V
C5002	⚠1-136-188-11	s	FILM 0.068uF 5% 250V
C5004	⚠1-115-383-11	s	CERAMIC 0.001uF 10% 125V
C5005	⚠1-115-383-11	s	CERAMIC 0.001uF 10% 125V
C5011	1-137-542-11	s	MYLAR
C5012	1-104-596-11	s	CERAMIC 39PF
C5013	1-119-664-11	s	CERAMIC 10uF
C5101	1-128-528-11	s	ELECT 470uF 20% 25V
C5102	1-104-666-11	s	ELECT 220uF 20% 25V
C5103	1-126-926-11	s	ELECT 1000uF 20% 10V
C5104	1-104-666-11	s	ELECT 220uF 20% 25V
C5105	1-126-947-11	s	ELECT 47uF 20% 35V
C5106	1-126-176-11	s	ELECT 220uF 20% 10V
C5110	1-130-491-00	s	MYLAR 0.047uF 5% 50V
C5115	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C5116	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
D5001	1-809-768-11	s	DIODE DBC10G
D5003	1-808-898-11	s	DIODE APOIC-V0
D5004	8-719-901-83	s	DIODE 1SS83
D5005	1-801-948-11	s	DIODE MTZJ36C
D5006	1-801-948-11	s	DIODE MTZJ36C
D5011	⚠1-809-752-11	s	PHOTOCOUPLER PC120FB
D5101	1-810-795-11	s	DIODE RL2Z-LF-C4
D5102	1-810-795-11	s	DIODE RL2Z-LF-C4
D5103	8-719-901-83	s	DIODE 1SS83
D5104	1-809-070-11	s	DIODE AK04-V2
D5105	8-719-921-40	s	DIODE MTZJ-4.7C
IC501	1-810-319-11	s	IC STR-M6549
IC511	1-810-060-11	s	IC L5431-AA
L5002	⚠1-409-611-11	s	COIL, LINE FILTER
L5003	1-414-540-11	s	INDUCTOR 0uH
L5101	1-410-509-11	s	INDUCTOR 10uH
L5102	1-410-509-11	s	INDUCTOR 10uH
PR512	⚠1-801-567-11	s	PROTECTOR 1.25A 125V
R5010	1-216-345-11	s	METAL 0.47 5% 1W
R5012	1-215-903-11	s	METAL 68K 5% 2W
R5013	1-247-887-00	s	CARBON 220K 5% 1/4W
R5014	1-247-887-00	s	CARBON 220K 5% 1/4W
R5015	1-247-887-00	s	CARBON 220K 5% 1/4W
R5016	1-247-887-00	s	CARBON 220K 5% 1/4W
R5017	1-247-887-00	s	CARBON 220K 5% 1/4W
R5018	1-247-887-00	s	CARBON 220K 5% 1/4W
R5019	1-249-393-11	s	CARBON 10 5% 1/4W
R5102	1-214-707-00	s	METAL 120 1% 1/4W
R5103	1-215-416-00	s	METAL 620 1% 1/6W
R5104	1-214-723-00	s	METAL 560 1% 1/4W
R5107	1-247-822-11	s	CARBON 430 5% 1/4W
R5108	1-249-417-11	s	CARBON 1K 5% 1/4W
R5110	1-249-430-11	s	CARBON 12K 5% 1/4W
R5111	1-249-391-11	s	CARBON 6.8 5% 1/4W
R5112	1-249-391-11	s	CARBON 6.8 5% 1/4W

(PW-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R5120	⚠1-212-851-00	s	RES, FUSIBLE 5.6 5% 1/4W
T5001	1-426-753-11	s	TRANSFORMER, POWER PULSE

TERMINAL UNIT

Ref. No. or Q'ty	Part No.	SP	Description
This assembly includes the TB-1 and TB-5 boards.			
1pc	1-769-188-11	s	CORD, TERMINAL
1pc	3-194-041-01	s	STAND
2pcs	7-685-647-79	s	SCREW +BVTP 3X10 TYPE2 N-S
1pc	7-685-661-19	s	SCREW +BVTP 4X12 TYPE2 N-S

TB-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-983-A	o	MOUNTED CIRUCIT BOARD, TB-1
C8501	1-162-294-31	s	CERAMIC 0.001uF 10% 50V
C8502	1-164-159-21	s	CERAMIC 0.1uF 50V
C8503	1-162-294-31	s	CERAMIC 0.001uF 10% 50V
C8504	1-164-159-21	s	CERAMIC 0.1uF 50V
C8505	1-164-159-21	s	CERAMIC 0.1uF 50V
C8506	1-162-294-31	s	CERAMIC 0.001uF 10% 50V
CN852	1-694-360-11	s	TERMINAL, BOARD
R8501	1-249-417-11	s	CARBON 1K 5% 1/4W
R8502	1-249-417-11	s	CARBON 1K 5% 1/4W
R8503	1-249-417-11	s	CARBON 1K 5% 1/4W
R8504	1-249-417-11	s	CARBON 1K 5% 1/4W
R8505	1-249-417-11	s	CARBON 1K 5% 1/4W
R8506	1-249-417-11	s	CARBON 1K 5% 1/4W

TB-5 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-982-A	o	MOUNTED CIRCUIT BOARD, TB-5
1pc	3-193-642-01	o	HOLDER
Z8801	⚠1-528-723-11	o	BATTERY, RECHARGEABLE

TB-6 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-059-A	o	MOUNTED CIRCUIT BOARD, TB-6
L8401	1-414-540-11	s	INDUCTOR 1.1uH
L8402	1-414-540-11	s	INDUCTOR 1.1uH
L8403	1-414-540-11	s	INDUCTOR 1.1uH

TM-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8315-782-A	o	MOUNTED CIRCUIT BOARD, TM-1
C7133	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
CN711	1-251-663-11	s	SOCKET, 8P
CN712	1-251-664-11	s	SOCKET, 5P
CN713	1-251-665-11	s	SOCKET, 3P
D7101	8-719-912-20	s	DIODE 1SS120
D7102	8-719-912-20	s	DIODE 1SS120
D7103	8-719-912-20	s	DIODE 1SS120
D7104	8-719-912-20	s	DIODE 1SS120
D7105	8-719-912-20	s	DIODE 1SS120
D7123	8-719-912-20	s	DIODE 1SS120
D7125	8-719-912-20	s	DIODE 1SS120
D7133	8-719-301-58	s	DIODE SEL2910D-TP2-D
D7134	1-801-879-11	s	LED SEL2410GM
Q7133	8-729-900-45	s	TRANSISTOR DTC114EF
R7135	1-249-407-11	s	CARBON 150 5% 1/4W
R7136	1-249-408-11	s	CARBON 180 5% 1/4W
S7101	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7102	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7104	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7107	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7109	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7113	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7114	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7115	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7116	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7117	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7118	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7119	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7121	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7122	1-762-304-11	s	SWITCH, PUSH (1P-1T)
S7123	1-572-416-11	s	SLIDE SWITCH
S7125	1-572-416-11	s	SLIDE SWITCH
S7126	1-762-304-11	s	SWITCH, PUSH (1P-1T)

VD-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-058-A	o	MOUNTED CIRCUIT BOARD, VD-1
C1701	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1702	1-162-209-31	s	CERAMIC 27pF 5% 50V
C1703	1-162-207-31	s	CERAMIC 22PF 5% 50V
C1705	1-162-203-31	s	CERAMIC 15pF 5% 50V
C1710	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1711	1-102-973-00	s	CERAMIC 100PF 5% 50V
C1712	1-162-211-31	s	CERAMIC 33PF 5% 50V
C1714	1-162-211-31	s	CERAMIC 33PF 5% 50V
C1715	1-164-060-11	s	CERAMIC 39PF 5% 50V
C1720	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1721	1-126-301-11	s	ELECT 1uF 20% 50V
C1722	1-126-301-11	s	ELECT 1uF 20% 50V
C1723	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1725	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1726	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1728	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1729	1-111-241-11	s	ELECT 10uF 20% 16V
C1741	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1742	1-126-155-11	s	ELECT 100uF 20% 6.3
C1752	1-161-021-11	s	CERAMIC 0.047uF 10% 25V
C1753	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1754	1-162-301-11	s	CERAMIC 0.0015uF 20% 16V
C1755	1-111-241-11	s	ELECT 10uF 20% 16V
C1756	1-162-294-31	s	CERAMIC 0.001uF 10% 50V
C1757	1-124-259-11	s	ELECT 4.7uF 20% 50V
C1758	1-102-973-00	s	CERAMIC 100PF 5% 50V
C1759	1-164-159-21	s	CERAMIC 0.1uF 50V
C1760	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1761	1-162-207-31	s	CERAMIC 22PF 5% 50V
C1763	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1771	1-164-060-11	s	CERAMIC 39PF 5% 50V
C1772	1-162-203-31	s	CERAMIC 15pF 5% 50V
C1773	1-101-880-00	s	CERAMIC 47PF 10% 50V
C1774	1-101-884-00	s	CERAMIC 56PF 5% 50V
C1776	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
CN171	1-251-663-11	s	SOCKET, 8P
IC171	8-752-031-49	s	IC CXA1203M
IC172	8-759-927-56	s	IC BA7021
L1701	1-410-518-41	s	INDUCTOR 56UH
L1702	1-410-516-11	s	INDUCTOR 39uH
L1703	1-410-516-11	s	INDUCTOR 39uH
L1710	1-410-516-11	s	INDUCTOR 39uH
L1711	1-410-516-11	s	INDUCTOR 39uH
L1712	1-410-516-11	s	INDUCTOR 39uH
L1771	1-410-509-11	s	INDUCTOR 10uH
Q1701	1-801-259-11	s	TR 2SA1782S
Q1702	1-801-983-11	s	TRANSISTER 2SC2840-D
Q1703	1-801-259-11	s	TR 2SA1782S
Q1704	1-801-983-11	s	TRANSISTER 2SC2840-D
Q1710	1-801-983-11	s	TRANSISTER 2SC2840-D
Q1711	1-801-259-11	s	TR 2SA1782S
Q1712	1-801-983-11	s	TRANSISTER 2SC2840-D
Q1721	1-801-259-11	s	TR 2SA1782S
Q1751	8-729-900-33	s	TRANSISTOR DTC144EF
Q1771	1-801-983-11	s	TRANSISTER 2SC2840-D

(VD-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
Q1772	1-801-983-11	s	TRANSISTER 2SC2840-D
R1701	1-249-405-11	s	CARBON 100 5% 1/4W
R1702	1-249-419-11	s	CARBON 1.5K 5% 1/4W
R1703	1-249-405-11	s	CARBON 100 5% 1/4W
R1704	1-249-417-11	s	CARBON 1K 5% 1/4W
R1705	1-249-419-11	s	CARBON 1.5K 5% 1/4W
R1706	1-249-423-11	s	CARBON 3.3K 5% 1/4W
R1708	1-249-419-11	s	CARBON 1.5K 5% 1/4W
R1709	1-249-414-11	s	CARBON 560 5% 1/4W
R1710	1-249-412-11	s	CARBON 390 5% 1/4W
R1711	1-249-416-11	s	CARBON 820 5% 1/4W
R1712	1-249-427-11	s	CARBON 6.8K 5% 1/4W
R1713	1-249-417-11	s	CARBON 1K 5% 1/4W
R1720	1-249-405-11	s	CARBON 100 5% 1/4W
R1721	1-249-417-11	s	CARBON 1K 5% 1/4W
R1722	1-249-422-11	s	CARBON 2.7K 5% 1/4W
R1723	1-249-419-11	s	CARBON 1.5K 5% 1/4W
R1724	1-249-417-11	s	CARBON 1K 5% 1/4W
R1725	1-249-414-11	s	CARBON 560 5% 1/4W
R1726	1-249-411-11	s	CARBON 330 5% 1/4W
R1727	1-249-416-11	s	CARBON 820 5% 1/4W
R1728	1-249-425-11	s	CARBON 4.7K 5% 1/4W
R1729	1-249-417-11	s	CARBON 1K 5% 1/4W
R1731	1-249-437-11	s	CARBON 47K 5% 1/4W
R1732	1-249-437-11	s	CARBON 47K 5% 1/4W
R1733	1-249-405-11	s	CARBON 100 5% 1/4W
R1734	1-249-417-11	s	CARBON 1K 5% 1/4W
R1751	1-249-433-11	s	CARBON 22K 5% 1/4W
R1752	1-249-419-11	s	CARBON 1.5K 5% 1/4W
R1753	1-249-419-11	s	CARBON 1.5K 5% 1/4W
R1754	1-247-891-00	s	CARBON 330K 5% 1/4W
R1755	1-247-883-00	s	CARBON 150K 5% 1/4W
R1756	1-249-441-11	s	CARBON 100K 5% 1/4W
R1757	1-249-429-11	s	CARBON 10K 5% 1/4W
R1759	1-249-428-11	s	CARBON 8.2K 5% 1/4W
R1760	1-249-413-11	s	CARBON 470 5% 1/4W
R1761	1-249-414-11	s	CARBON 560 5% 1/4W
R1762	1-249-415-11	s	CARBON 680 5% 1/4W
R1763	1-249-417-11	s	CARBON 1K 5% 1/4W
R1771	1-249-411-11	s	CARBON 330 5% 1/4W
R1772	1-249-424-11	s	CARBON 3.9K 5% 1/4W
R1773	1-249-418-11	s	CARBON 1.2K 5% 1/4W
R1774	1-249-410-11	s	CARBON 270 5% 1/4W
R1775	1-249-418-11	s	CARBON 1.2K 5% 1/4W
R1776	1-249-414-11	s	CARBON 560 5% 1/4W

VP-1 BOARD

Ref. No. or Q'ty	Part No.	SP	Description
1pc	A-8317-056-A	o	MOUNTED CIRCUIT BOARD, VP-1
1pc	3-194-195-01	s	SHIELD
1pc	3-194-194-01	s	SHIELD
C1801	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1804	1-162-284-31	s	CERAMIC 150pF 10% 50V
C1805	1-102-976-00	s	CERAMIC 180PF 5% 50V
C1807	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1808	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1809	1-162-209-31	s	CERAMIC 27pF 5% 50V
C1810	1-102-947-00	s	CERAMIC 10PF 0.5PF 50V
C1811	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1812	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1813	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1817	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1818	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1821	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1822	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1831	1-162-215-31	s	CERAMIC 47PF 5% 50V
C1832	1-101-884-00	s	CERAMIC 56PF 5% 50V
C1833	1-102-973-00	s	CERAMIC 100PF 5% 50V
C1834	1-101-884-00	s	CERAMIC 56PF 5% 50V
C1836	1-162-211-31	s	CERAMIC 33PF 5% 50V
C1837	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1839	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1840	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1841	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1851	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1852	1-161-063-00	s	CERAMIC 0.1uF 10% 50V
C1853	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1854	1-162-219-31	s	CERAMIC 68pF 5% 50V
C1855	1-162-287-31	s	CERAMIC 270PF 10% 50V
C1856	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1858	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1859	1-126-154-11	s	ELECT 47uF 20% 6.3V
C1860	1-102-976-00	s	CERAMIC 180PF 5% 50V
C1865	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1881	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1882	1-127-550-11	s	ELECTSOLID 3.3uF 20% 16V
C1883	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1884	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1885	1-124-252-00	s	ELECT 0.33uF 20% 50V
C1886	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1887	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1890	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1892	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1893	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1894	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1895	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1896	1-161-059-00	s	CERAMIC 0.047uF 10% 50V
C1897	1-102-129-00	s	CERAMIC 0.01uF 10% 50V
C1899	1-102-943-00	s	CERAMIC 6PF 0.5PF 50V
D1881	8-719-912-20	s	DIODE 1SS120
IC181	1-809-673-11	s	IC LA7374
L1803	1-410-519-11	s	INDUCTOR 68uH
L1804	1-410-335-11	s	INDUCTOR 150UH
L1805	1-410-512-11	s	INDUCTOR 18uH
L1831	1-410-511-11	s	INDUCTOR 15uH

(VP-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
L1832	1-410-511-11	s	INDUCTOR 15uH
L1833	1-410-492-11	s	INDUCTOR 680uH
L1834	1-410-517-11	s	INDUCTOR 47uH
L1835	1-410-506-11	s	INDUCTOR 5.6uH
L1851	1-408-104-00	s	INDUCTOR 1mH
L1852	1-410-525-11	s	INDUCTOR 220uH
L1853	1-410-521-11	s	INDUCTOR 100uH
L1854	1-408-426-00	s	INDUCTOR 270uH
L1860	1-410-515-11	s	INDUCTOR 33uH
Q1801	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1802	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1803	1-801-806-11	s	TRANSISTOR DTC144EK
Q1804	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1805	8-729-216-22	s	TRANSISTOR 2SA1162
Q1806	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1807	1-801-806-11	s	TRANSISTOR DTC144EK
Q1808	1-801-806-11	s	TRANSISTOR DTC144EK
Q1809	1-801-806-11	s	TRANSISTOR DTC144EK
Q1831	8-729-101-25	s	TRANSISTOR 2SC1009A
Q1832	8-729-101-25	s	TRANSISTOR 2SC1009A
Q1833	1-801-806-11	s	TRANSISTOR DTC144EK
Q1834	8-729-101-25	s	TRANSISTOR 2SC1009A
Q1835	8-729-216-22	s	TRANSISTOR 2SA1162
Q1851	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1852	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1853	8-729-620-06	s	TRANSISTOR 2SC3052-EF
Q1861	8-729-216-22	s	TRANSISTOR 2SA1162
Q1862	8-729-620-06	s	TRANSISTOR 2SC3052-EF
R1801	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R1803	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R1804	1-216-069-11	s	METAL 6.8k 5% 1/10W
R1805	1-216-067-00	s	METAL, CHIP 5.6K 5% 1/10W
R1806	1-216-061-00	s	METAL, CHIP 3.3K 5% 1/10W
R1807	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W
R1808	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1809	1-216-073-00	s	METAL, CHIP 10K 5% 1/10W
R1810	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1811	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1812	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1813	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R1814	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R1815	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1816	1-216-059-00	s	METAL, CHIP 2.7K 5% 1/10W
R1818	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1819	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1820	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1821	1-216-063-00	s	METAL, CHIP 3.9K 5% 1/10W
R1822	1-216-059-00	s	METAL, CHIP 2.7K 5% 1/10W
R1823	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1831	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1832	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W
R1833	1-216-047-00	s	METAL, CHIP 820 5% 1/10W
R1834	1-216-041-11	s	METAL, CHIP 470 5% 1/10W
R1835	1-218-147-11	s	METAL 750 1% 1/10W
R1836	1-216-051-00	s	METAL, CHIP 1.2K 5% 1/10W
R1837	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R1838	1-216-045-00	s	METAL, CHIP 680 5% 1/10W
R1840	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W

(VP-1 BOARD)

Ref. No. or Q'ty	Part No.	SP	Description
R1841	1-216-055-00	s	METAL, CHIP 1.8K 5% 1/10W
R1842	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1843	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1851	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1852	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
R1853	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1854	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1855	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1856	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1857	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1861	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1862	1-216-039-00	s	METAL, CHIP 390 5% 1/10W
R1863	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1864	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1881	1-216-677-11	s	METAL, CHIP 12K 0.5% 1/10W
R1882	1-216-067-00	s	METAL, CHIP 5.6K 5% 1/10W
R1883	1-216-043-00	s	METAL, CHIP 560 5% 1/10W
R1884	1-216-049-11	s	METAL, CHIP 1K 5% 1/10W
R1887	1-216-069-11	s	METAL 6.8k 5% 1/10W
R1889	1-216-085-00	s	METAL, CHIP 33K 5% 1/10W
R1891	1-216-057-00	s	METAL, CHIP 2.2K 5% 1/10W
R1892	1-216-081-00	s	METAL, CHIP 22K 5% 1/10W
VR181	1-228-991-00	s	RES, ADJ, METAL 2.2K
VR182	1-228-991-00	s	RES, ADJ, METAL 2.2K

FRAME

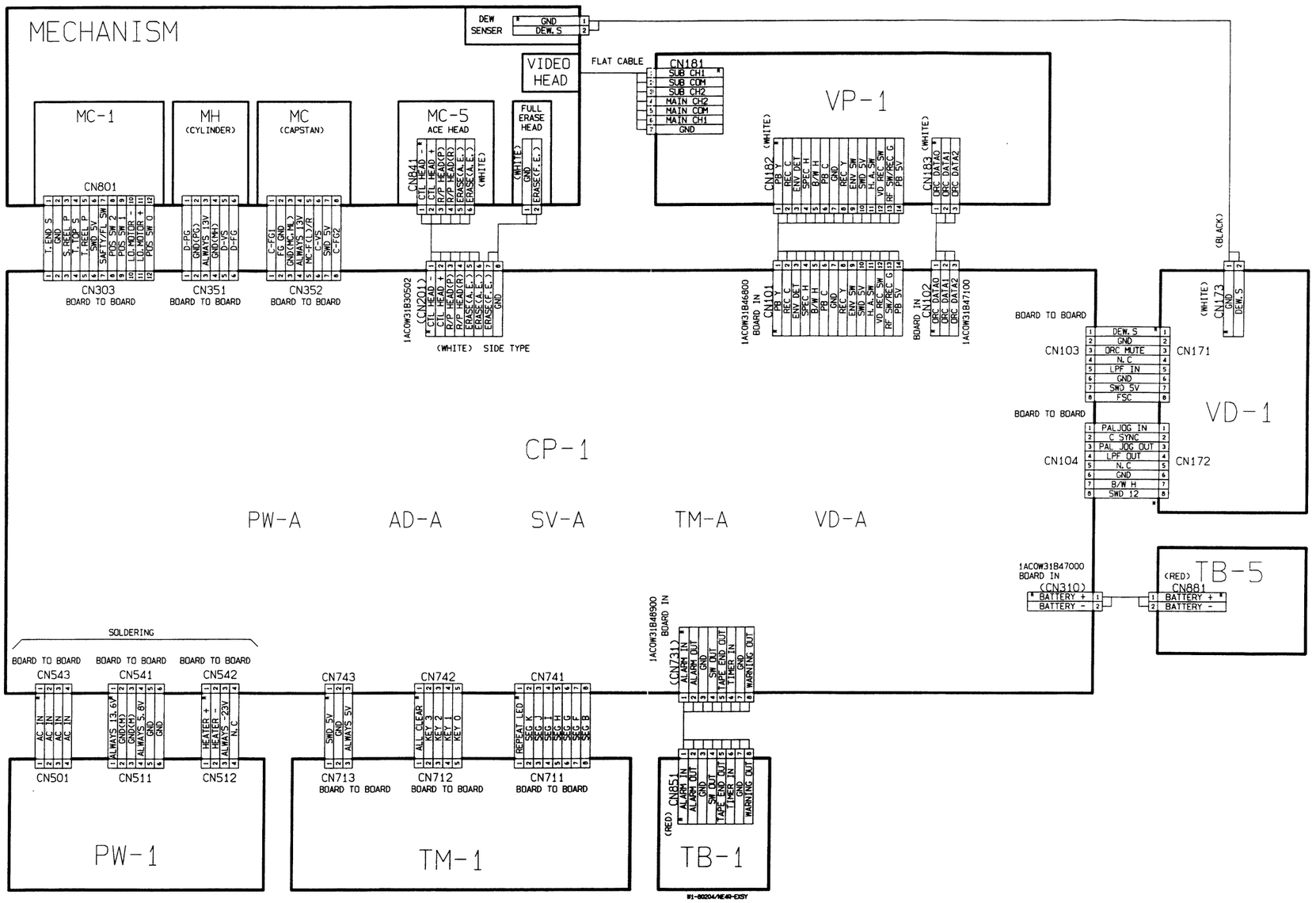
Ref. No. or Q'ty	Part No.	SP	Description
MC8001	1-698-579-11	s	MOTOR, CAPSTAN DC 3W
PC801	1-801-326-11	s	PHOTO COUPLER SG-105F
PC802	1-801-326-11	s	PHOTO COUPLER SG-105F
D8003	1-810-690-11	s	LED LN59L
D8001	1-810-691-11	s	PHOTO DIODE PN263L-NC
M8002	1-698-912-11	s	MOTOR, ROTOR CYL DC 2W
M8003	1-698-913-11	s	MOTOR, STATOR CYL DC 2W

PACKING MATERIALS & SUPPLIED ACCESSORIES

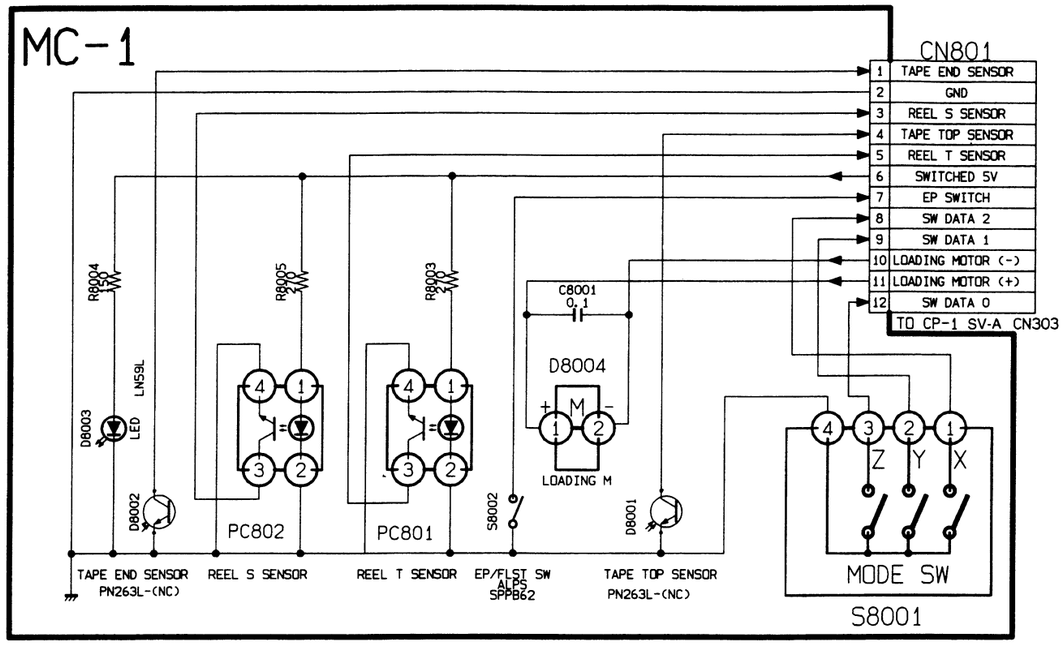
Ref. No. or Q'ty	Part No.	SP	Description
1pc	⚠1-534-827-14	s	CORD, POWER
1pc	3-194-198-02	o	MANUAL, INSTRUCTION

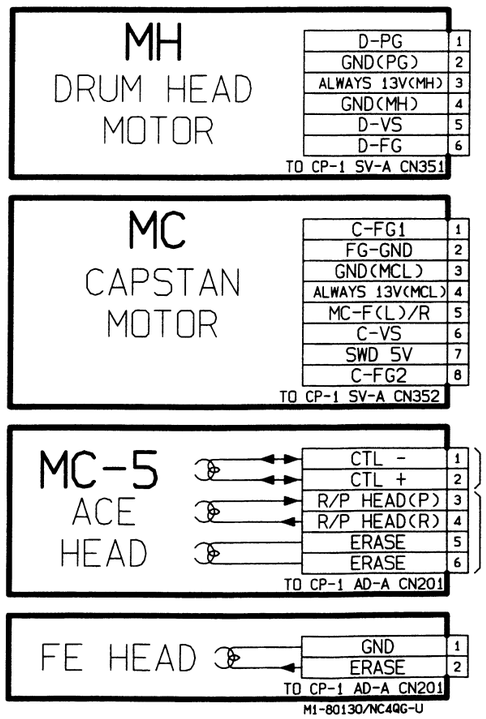
SECTION 6
BLOCK DIAGRAMS, SCHEMATIC DIAGRAMS & BOARDS LAYOUTS

OVERALL WIRING

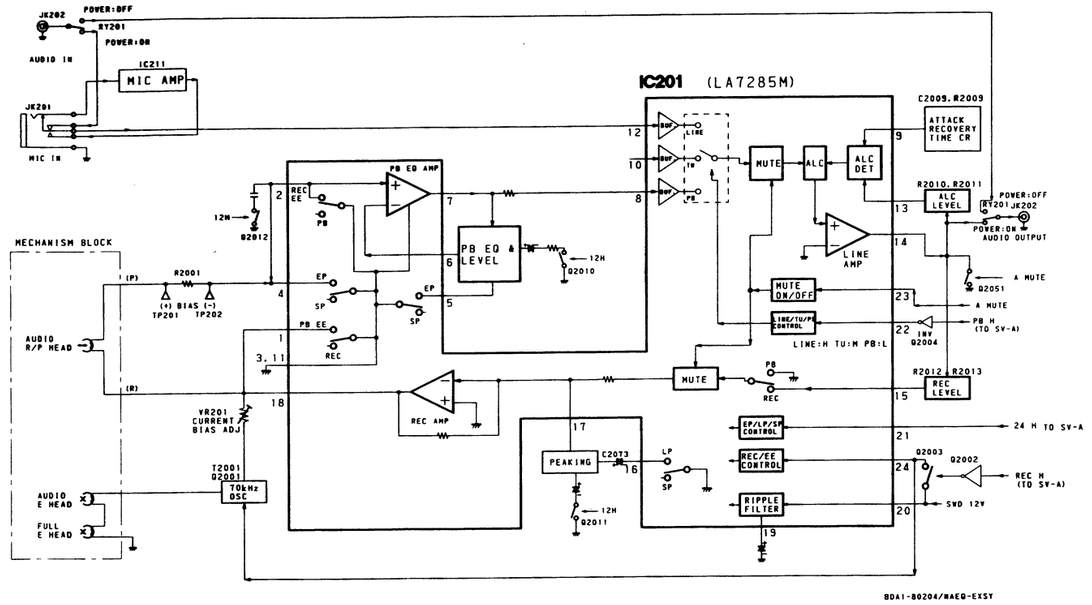


MECHANISM CONNECTION

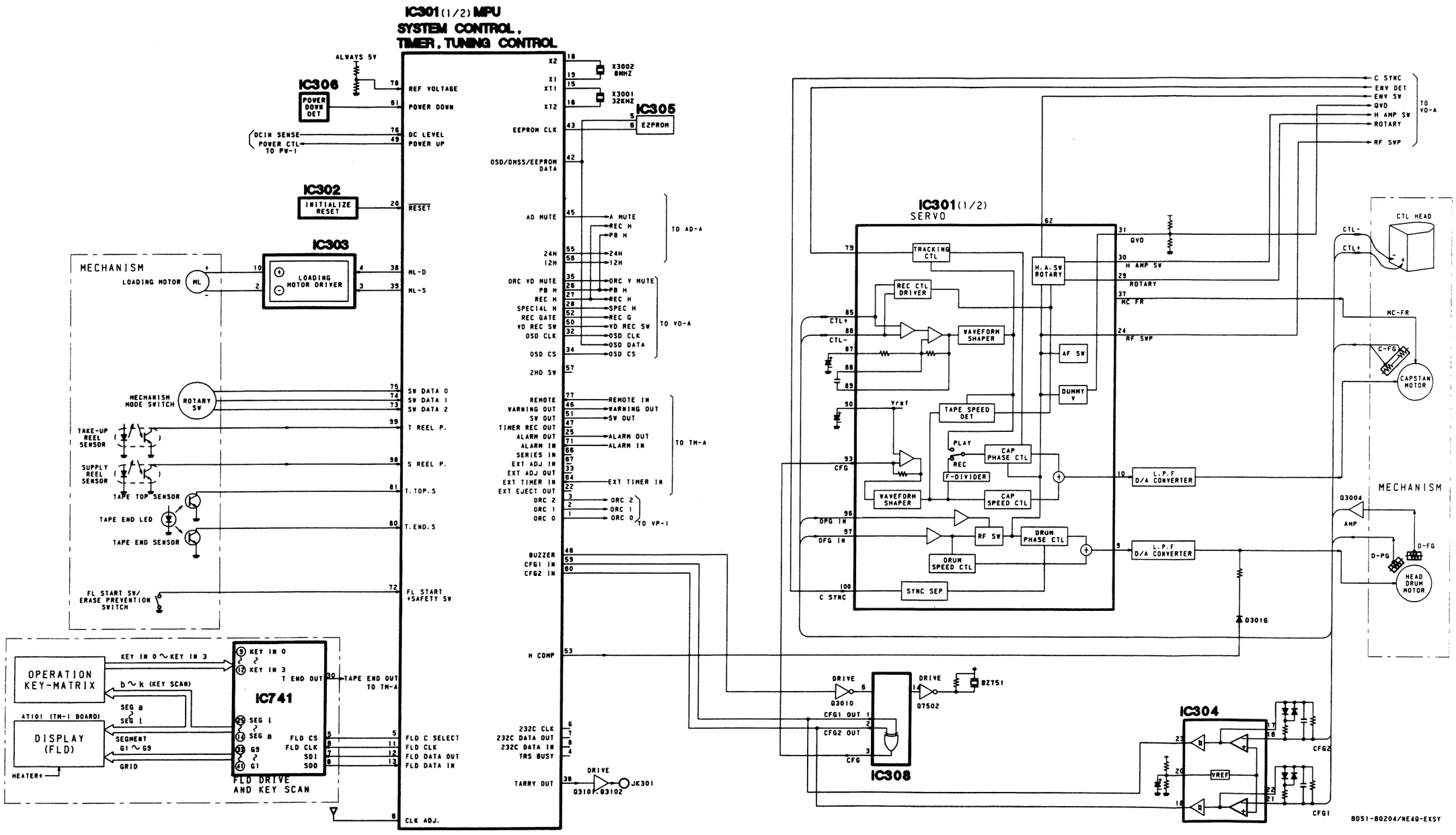




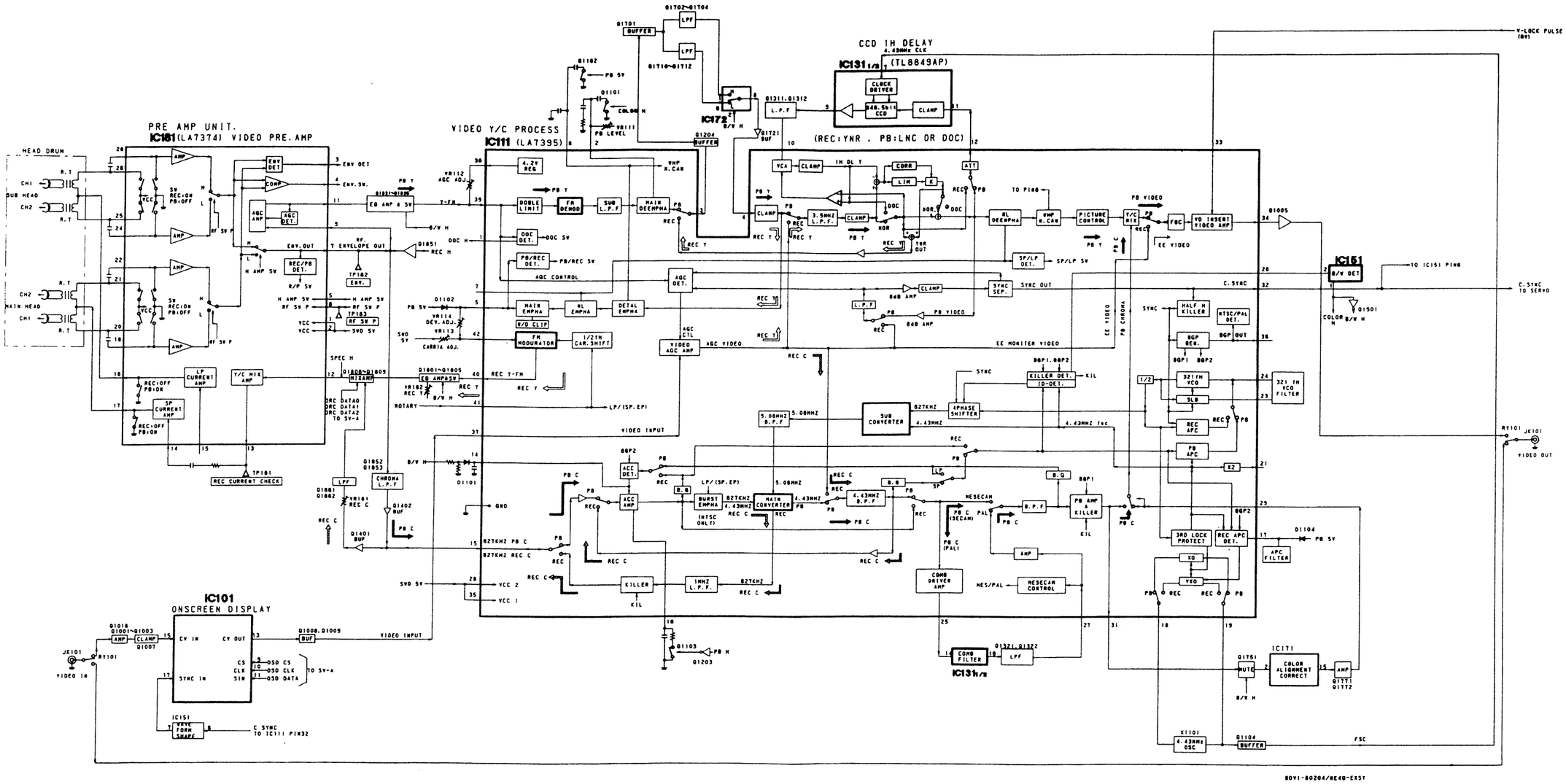
AUDIO CIRCUIT



SYSTEM CONTROL & SERVO CIRCUIT

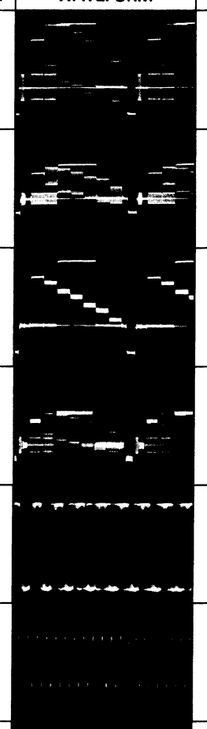
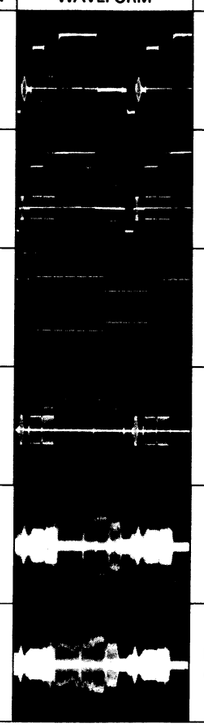


VIDEO CIRCUIT

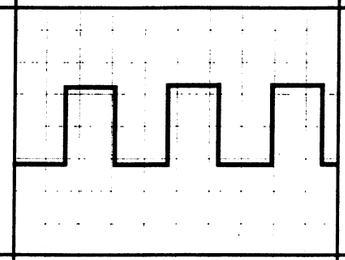
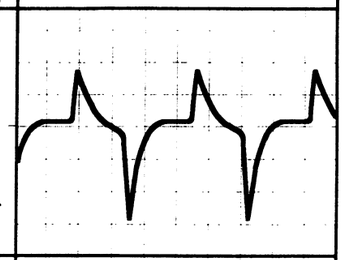
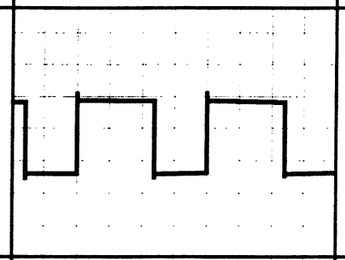
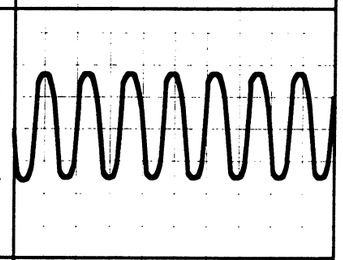
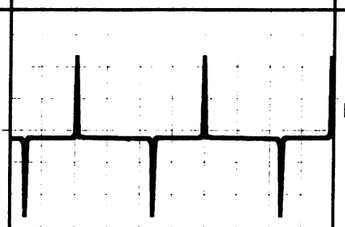
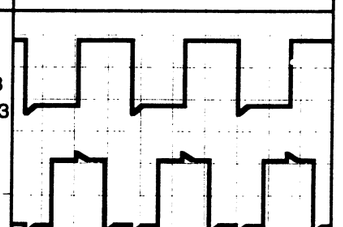
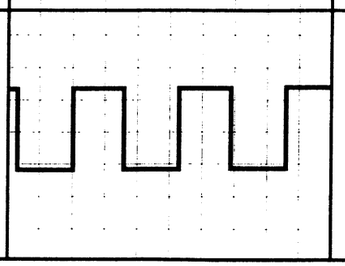


VIDEO CIRCUIT WAVEFORMS

WF-V-EA

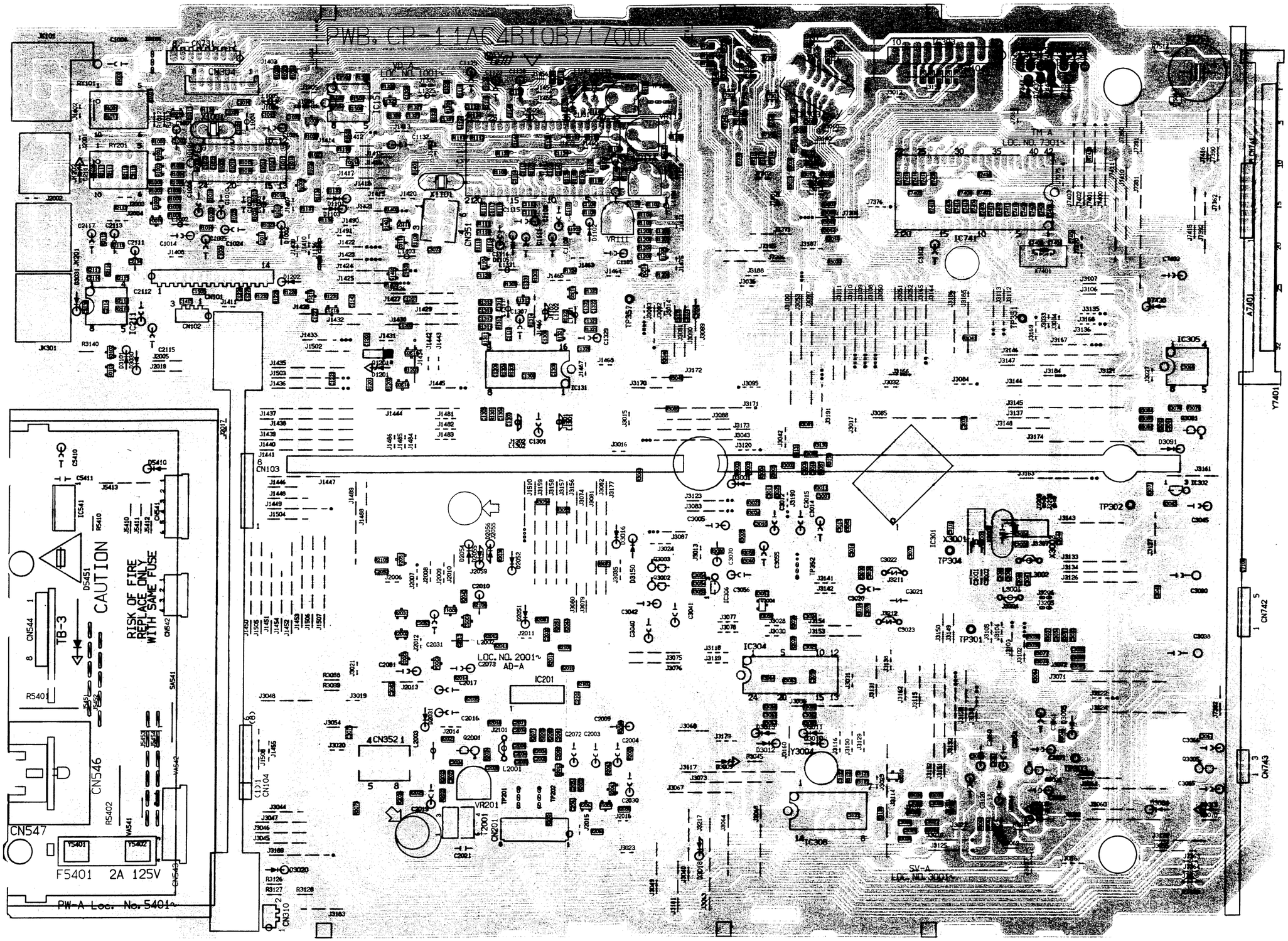
TEST LOCATION	WAVEFORM	MODE/LEVEL	TEST LOCATION	WAVEFORM	MODE/LEVEL
IC111 Pin 37		REC, EE 1 Vp-p	IC111 Pin 34		PB 2 Vp-p
IC111 Pin 3		REC, EE 0.6 Vp-p	IC111 Pin 34		REC, EE 2 Vp-p
IC111 Pin 4		REC, EE 0.5 Vp-p	IC111 (UPPER) Pin 34 (LOWER) Pin 33		STILL (UPPER) 2 Vp-p (LOWER) 5 Vp-p
IC111 Pin 5		REC, EE 1.2 Vp-p	IC111 Pin 15		REC, EE 0.35Vp-p
IC111 Pin 40		REC, EE 1.0 Vp-p	IC111 Pin 15		PB 0.15 Vp-p
IC111 Pin 39		PB 0.3 Vp-p	IC111 Pin 25		PB 0.8Vp-p
IC111 Pin 3		PB 0.5 Vp-p			
IC111 Pin 4		PB 0.5 Vp-p			
IC111 Pins 10/12		PB 0.3 Vp-p			

SERVO CIRCUIT WAVEFORMS

TEST LOCATION	WAVEFORM	TEST LOCATION	WAVEFORM
IC301 PIN 9,10 REC/PB 2V/div. 5μs/div.		IC301 PIN 99 REC/PB 1V/div. 200ms/div.	
IC301 PIN 85 REC 2V/div. 10ms/div.		IC304 PIN 17, 22 REC/PB 200mV/div. 500μs/div.	
IC301 PIN 88 PB 500mV/div. 10ms/div.		IC304 UP: PIN 18 LOW: PIN23 REC/PB 2V/div. 200μs/div.	
IC301 PIN 93 REC/PB 2V/div. 100μs/div.			

WF-S-FE4Q

CP-1 BOARD

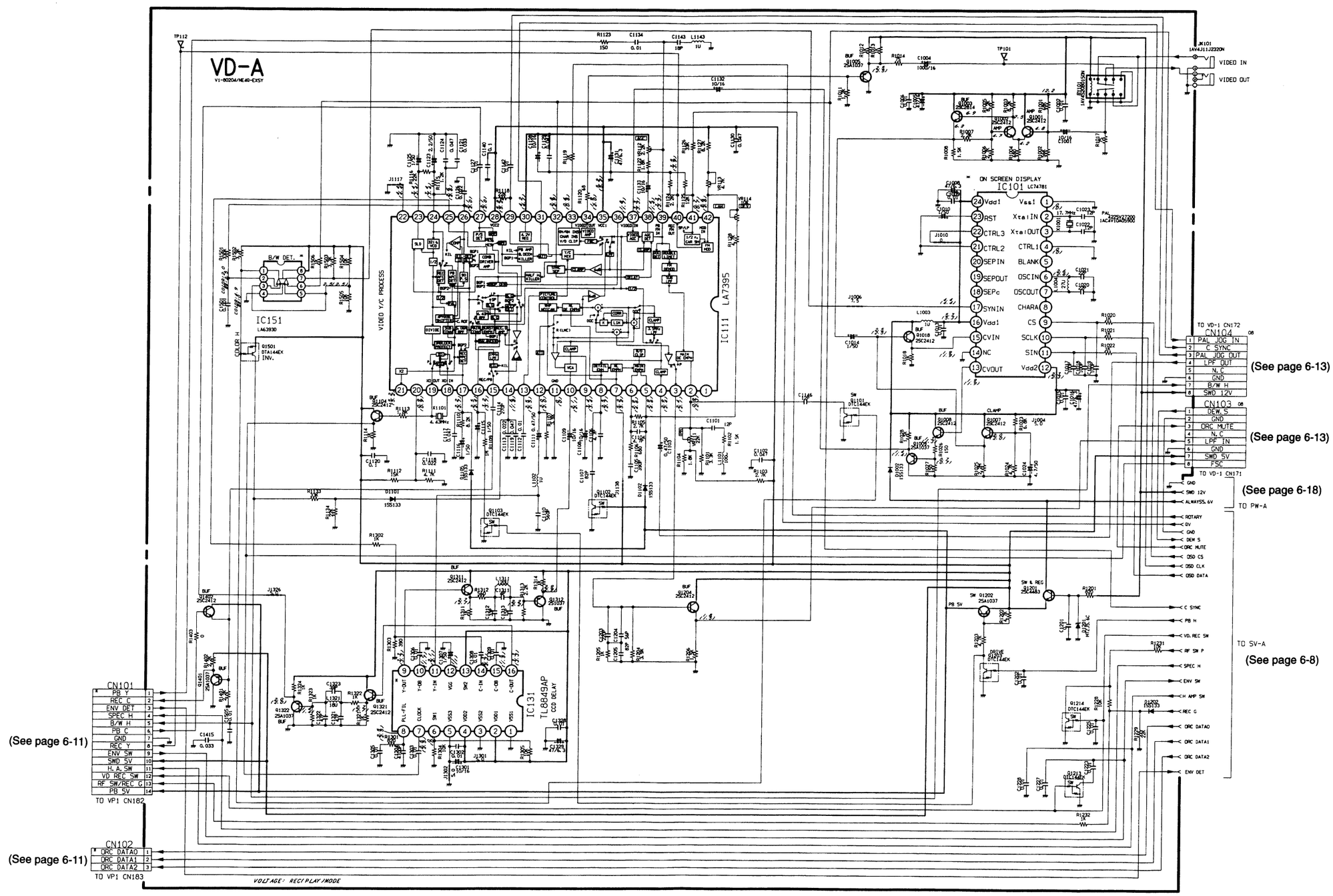


6-6 6-6

SVT-124P

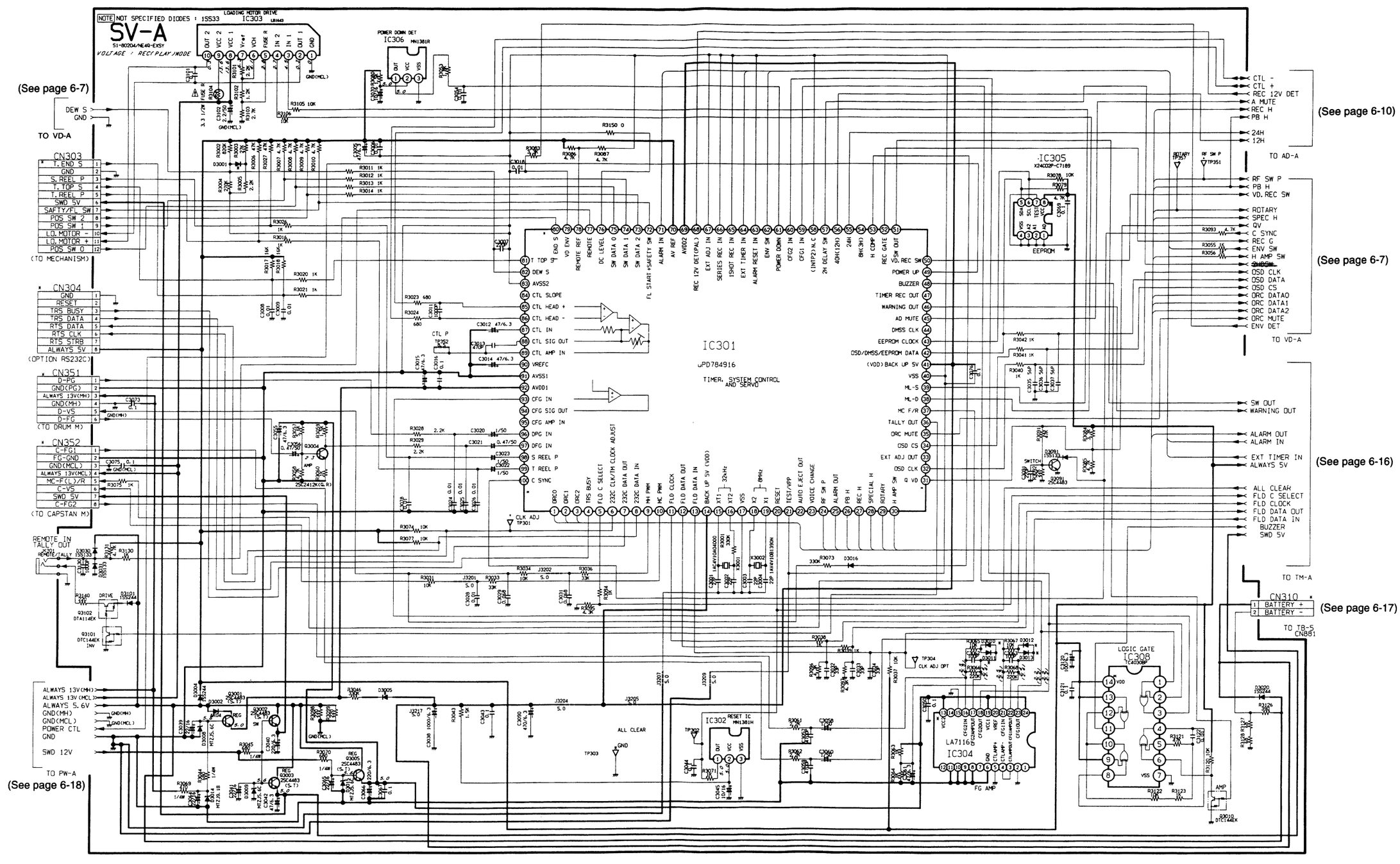
A | B | C | D | E | F | G | H

VIDEO


VD-A
V1-8020A/NE40-EXSY
IC111 LA7395
VIDEO Y/C PROCESS
IC151 LA6393D
B/W DET.
COLOR H
Q1501 DTA144EK INV.
IC101 LC74781
ON SCREEN DISPLAY
Vdd1 RST CTRL3 CTRL2 SEPIN SEPOUT SEPc SYNIN Vdd1 CVIN NC CVOUT
Vss1 XtalIN XtalOUT CTRL1 BLANK OSCIN OSCUT CHARA CS SCLK SIN Vdd2
17.7MHz
IC131 TL8849AP CCD DELAY
Y-OUT Y-DB Y-IN VCC SW2 C-IN C-DB C-OUT
PLL-FIL CLOCK SW1 VSS3 VDD2 VSS2 VDD1 VSS1
VIDEO IN
VIDEO OUT
TO VD-1 CN172
CN104
PAL JOG IN
C SYNC
PAL JOG OUT
LPF OUT
N.C
GND
B/W H
SWD 12V
(See page 6-13)
CN103
DEW.S
GND
ORC MUTE
N.C
LPF IN
GND
SWD 5V
FSC
(See page 6-13)
TO VD-1 CN171
GND
SWD 12V
ALWAYS5.6V
ROTARY
0V
GND
DEW S
ORC MUTE
OSD CS
OSD CLK
OSD DATA
(See page 6-18)
TO PW-A
C SYNC
PB H
VD. REC SW
RF SW P
SPEC H
ENV SW
H AMP SW
REC G
ORC DATA0
ORC DATA1
ORC DATA2
ENV DET
TO SV-A
(See page 6-8)
CN101
PB Y
REC C
ENV DET
SPEC H
B/W H
PB C
GND
REC Y
ENV SW
SWD 5V
H. A. SW
VD REC SW
RF SW/REC G
PB 5V
TO VP1 CN182
(See page 6-11)
CN102
ORC DATA0
ORC DATA1
ORC DATA2
TO VP1 CN183
(See page 6-11)
VOLTAGE: REC/PLAY MODE

1 2 3 4 5

SYSTEM CONTROL & SERVO

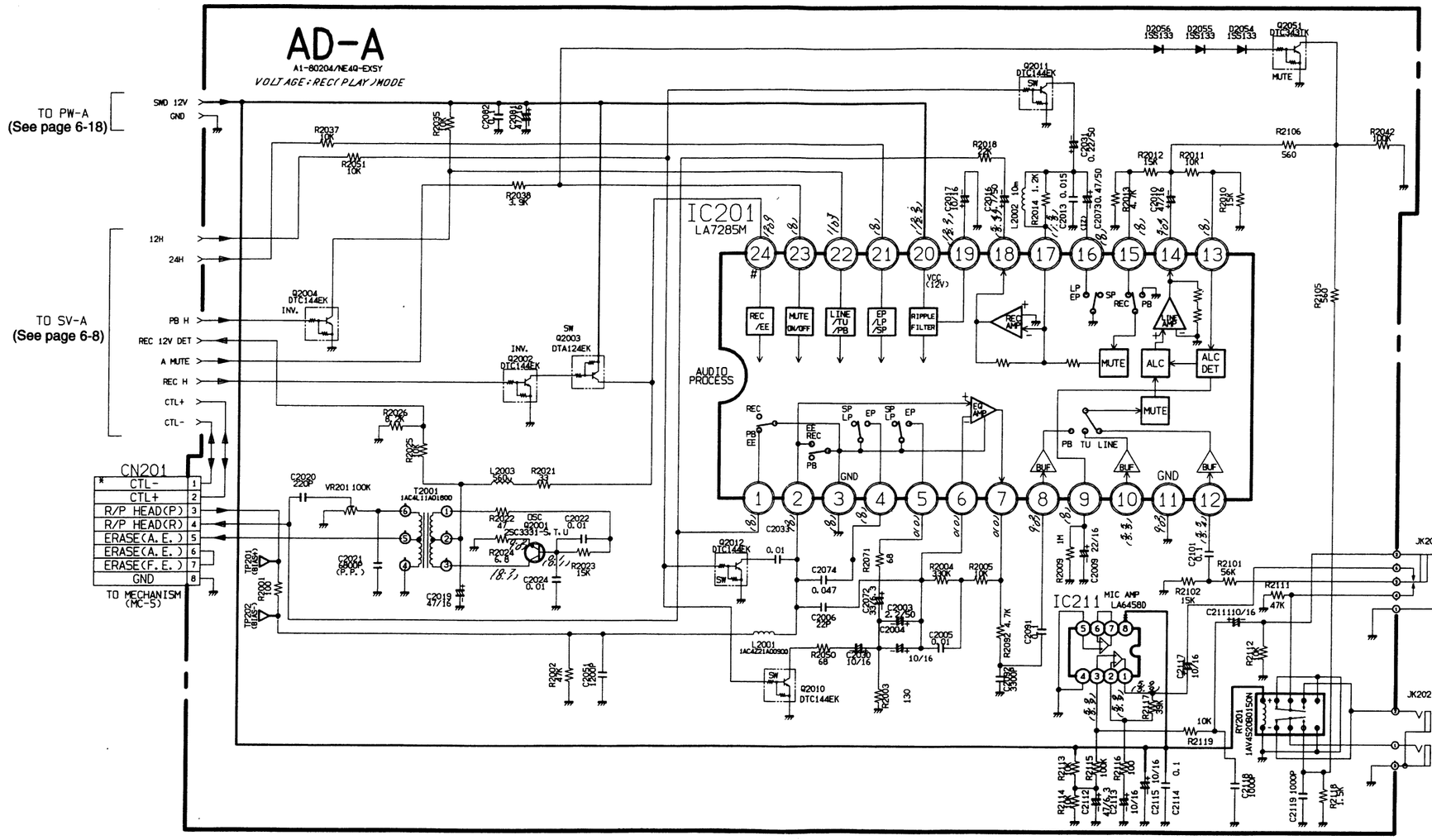


IC301 SYSTEM CONTROL/SERVO MPU PIN FUNCTIONS TABLE

No.	Name	I/O	H/L	Signal Function
1	ORC0	O	-	Optimum picture control (ORC) data signal.
2	ORC1	O	-	Signal control to video recording current, EQ-amp
3	ORC2	O	-	charactristics.
4	TRS BUSY	O	H	Busy signal to 232C controal unit.
5	FLD C SELECT	O	H	Chip select signal to FLD display control MPU.
6	232C CLK	O	-	Clock signal to 232C controal unit.
7	232C DATA OUT	O	-	Output data to 232C controal unit.
8	232C DATA IN	I	-	Input data from 232C controal unit.
9	MH PWM	O	-	Output of head drum motor servo control signal. (pulse with modulation "PWM" signal)
10	MC PWM	O	-	Output of capstan motor servo control signal. (pulse with modulation "PWM" signal)
11	FLD CLK	O	-	Clock output to FLD display control MPU.
12	FLD DATA OUT	O	-	Data output to FLD display control MPU.
13	FLD DATA IN	I	-	Data input from FLD display control MPU.
14	Vdd	-	-	IC power source pin. (5v)
15	XT1	-	-	IC timer clock OSC terminal.
16	XT2	-	-	Frequency is 32KHz.
17	Vss	-	-	Ground terminal.
18	X2	-	-	IC clock OSC terminal.
19	X1	-	-	Frequency is 8MHz.
20	RESET	I	L	IC initial reset pin. (reset when "LOW")
21	TEST/VPP	-	-	NOT USE
22	AUTO EJECT OUT	-	-	NOT USE
23	VOICE CHANGE	O	H	Signal to indicate "Audio filter" is ON.
24	RF SW P	I	-	Input of RF switching pulse created by head drum PG.
25	ALARM OUT	O	-	Signal to indicate ALARM REC mode.
26	PB H	O	H	Signal for indicating playback mode.
27	REC H	O	H	Signal for indicating recording mode.
28	SPECIAL H	O	H	Special playback mode (search, slow, still, etc..) indication signal.
29	ROTARY	O	-	Video head CH1/CH2 confirmation signal. (Used in the processing of image circuit color signals.)
30	H. AMP SW	O	-	Main head and sub head switching signal.
31	QVD	O	H	Quasi vertical synchronizing signal.
32	OSD CLK	O	-	Clock to control on screen display control IC.
33	EXT ADJ OUT	O	H	Timer clock adjust signal output.
34	OSD CS	O	H	Cs signal output to on screen display control IC.
35	ORC MUTE	O	H	MUTE while ORC detector is working.
36	TALLY OUT	O	-	Signal to indicate REC, REC-Pause, Warning or tape-end.
37	MC F/R	O	-	Capstan motor rotation direction (normal/reverse) indication signal. (reverse; "H")
38	ML - D	O	-	Loading motor rotation direction indication signal. (load "H", brake "M", unload "L")
39	ML - S	O	-	Loading motor rotation speed (high / medium / low) indication signal.
40	Vss	-	-	Ground terminal.
41	Vdd	-	-	IC power source pin. (5v)
42	COMMON DATA	O	-	Data signal for OSD, DMSS and EEPROM IC.
43	EEPROM CLK	O	-	Clock to EEPROM IC.
44	DMSS CLK	O	-	Clock to DMSS IC.
45	AD MUTE	O	H	Signal disable audio signal output.
46	WARNING OUT	O	L	Warning signal output pin.
47	TIMER REC OUT	O	L	Timer recording mode indication signal.
48	BUZZER	O	-	Buzzer drive signal.
49	POWER UP	O	H	Power source ON/OFF signal. ("H" when on)
50	VD REC SW	O	H	Output 'H' during video recording mode.
51	SW OUT	O	H	Output of signal to "SW OUT" external output pin.
52	REC GATE	O	L	Signal that indicates video head recording timing in the REC mode. Especially in the 24H mode.
53	H COMP	O	-	Pulse that corrects the number of drum rotations during 24H recording.
54	8H	O	H	Output "H" during recording or playback in the 8H mode.
55	24H	O	H	Output "H" during recording or playback in the 24H mode.
56	12H	O	H	Output "H" during recording or playback in the 12H mode.
57	2H DELAY SW	O	H	2H delay circuit control signal.
58	NC	-	-	-
59	CFG 1	I	-	Capstan motor FG-1 pulse input (for capstan servo).
60	CFG 2	I	-	Capstan motor FG-2 pulse input (for capstan "slow").
61	POWER DOWN	I	L	Power failure detection terminal.
62	ENV SW	I	-	Output comparison signal for main head and sub head.
63	ALARM RESET IN	I	H	Signal to stop ALARM REC.
64	EXT TIMER IN	I	H	Signal to start TIMER REC.
65	1 SHOT REC IN	I	H	Signal to start 1SHOT REC.
66	SERIES REC IN	O	H	Control signal for series REC mode input.
67	EXT ADJ IN	I	H	Timer clock adjust signal input.
68	REC 12V DET	I	L	not use
69	AVdd	-	-	IC power source pin for analog circuitry. (5v)
70	AVref	-	-	Reference voltage power source pin for analog circuitry.
71	ALARM IN	I	H	ALARM REC signal input.
72	FL START + SAFETY SW	I	L	Terminal for detecting accidental erasure prevention tab of cassette tape.
73	SW DATA 2	I	L	
74	SW DATA 1	I	L	Input of the three-bit signal that indicates mechanism
75	SW DATA 0	I	L	operational position.
76	DC LEVEL	I	H	DC12V input detection signal input.
77	REMOTE	I	-	Remote control signal input.
78	REMOTE REF	I	L	Reference voltage pin for AD port. (1/2Vcc)
79	VD ENV	I	-	Video head envelope detection signal input for ATR function.
80	T. END S.	I	L	Sensor signal input for tape end detection.
81	T. TOP S.	I	L	Sensor signal input for tape beginning detection.
82	DEW S	I	H	Dew sensor input pin.
83	AVss	-	-	Ground pin for analog circuitry.
84	CTL SLOPE	-	-	NOT USE
85	CTL HEAD +	I/O	-	CTL pulse I/O
86	CTL HEAD -	I/O	-	CTL pulse I/O
87	CTL IN	-	-	CTL AMP feed back filter
88	CTL SIG OUT	O	-	CTL AMP OUT
89	CTL AMP IN	I	-	Input signal from CTL AMP
90	Vref	-	-	Reference voltage power source pin for servo circuitry.
91	AVss1	-	-	Ground terminal.
92	AVdd1	-	-	IC power source pin for analog circuitry. (5V)
93	CFG IN	I	-	Capstan motor FG pulse input.
94	CFG SIG OUT	-	-	NOT USE
95	CFG AMP IN	-	-	NOT USE
96	DPG IN	I	-	Head drum PG pulse input. (Used in servo control and to generate the switching pulse.)
97	DFG IN	I	-	Head drum FG pulse input. (for head servo)
98	S REEL P	I	-	Supply reel moving sensor input.
99	T REEL P	I	-	Take up reel moving sensor input.
100	C SYNC	I	-	Composite synchronizing signal input.

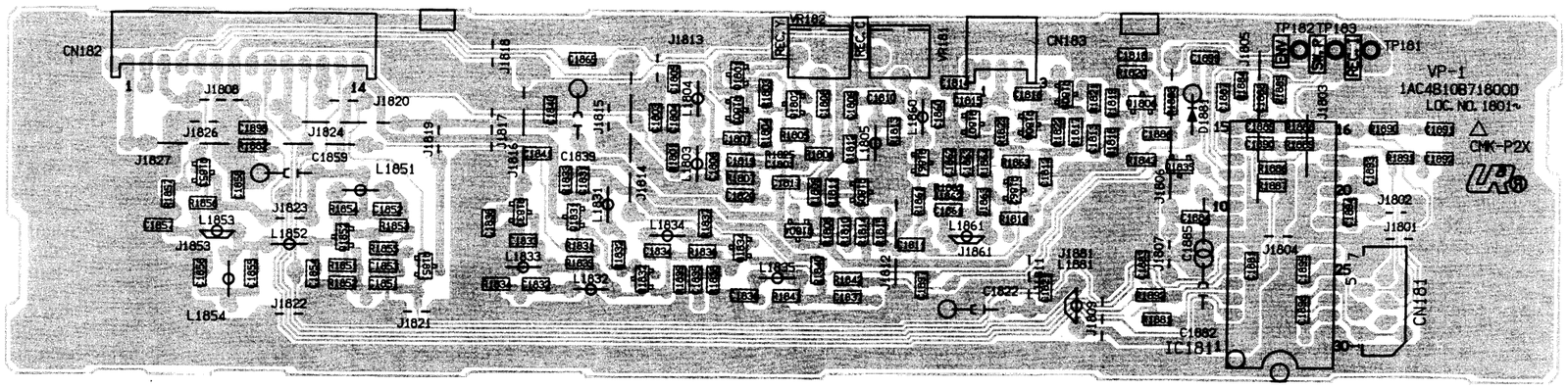
NA4Q_IC301

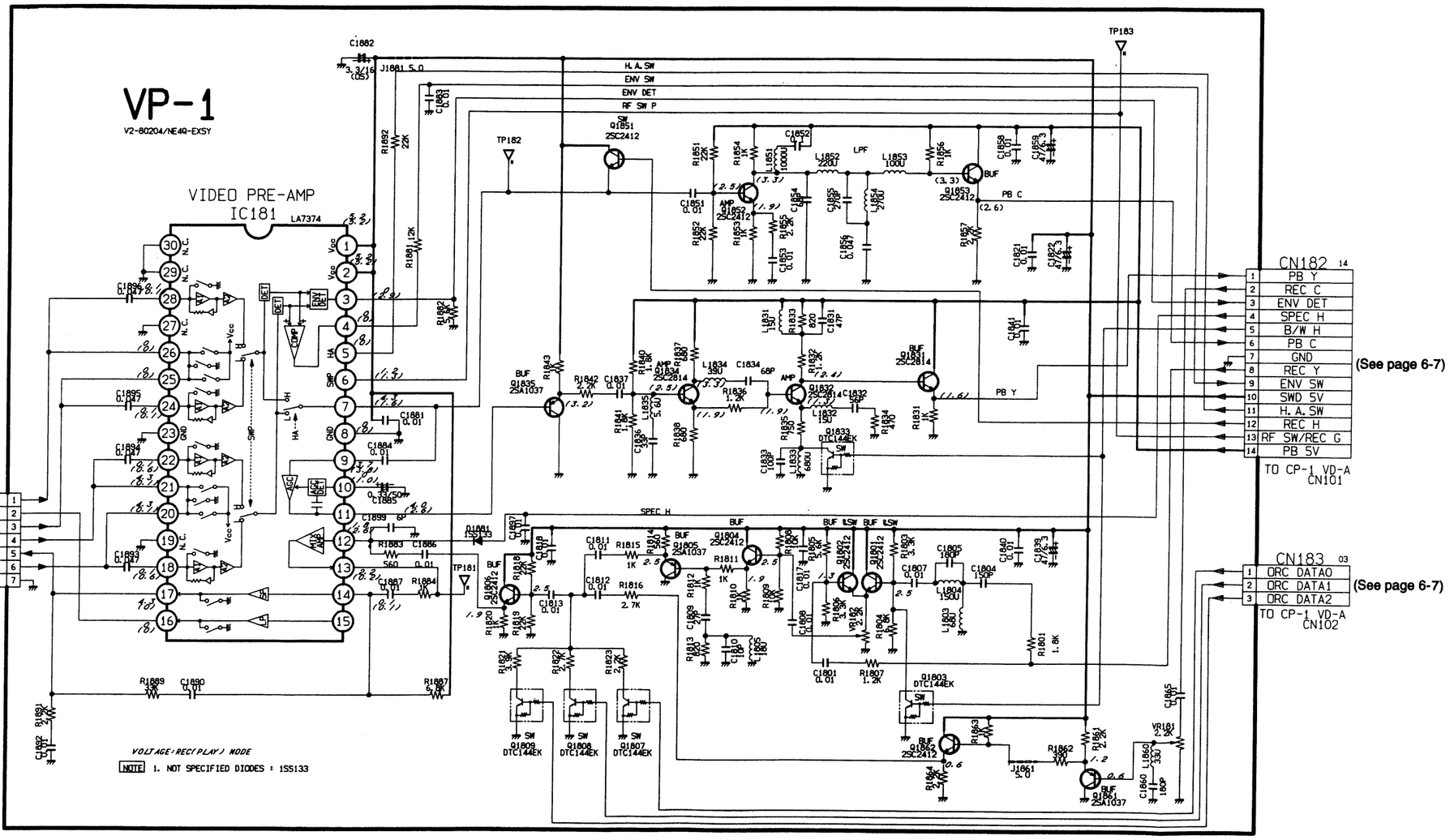
AUDIO


AD-A
A1-80204/NE4Q-EX5Y
VOLTAGE : REC(PLAY)MODE
TO PW-A
(See page 6-18)
TO SV-A
(See page 6-8)
SMD 12V
GND
12H
24H
PB H
REC 12V DET
A MUTE
REC H
CTL+
CTL-
IC201
LA7285M
AUDIO PROCESS
REC /EE
MUTE ON/OFF
LINE /TU /PB
EP /LP /SP
RIPPLE FILTER
REC AMP
ALC
ALC DET
MUTE
VCC (12V)
EQ AMP
BUF
GND
CN201
CTL-
CTL+
R/P HEAD(P)
R/P HEAD(R)
ERASE(A.E.)
ERASE(A.E.)
ERASE(F.E.)
GND
TO MECHANISM (MC-5)
IC211 MIC AMP LA64580
JK201
MIC IN
JK202
AUDIO IN
AUDIO OUT

VIDEO PRE-AMP

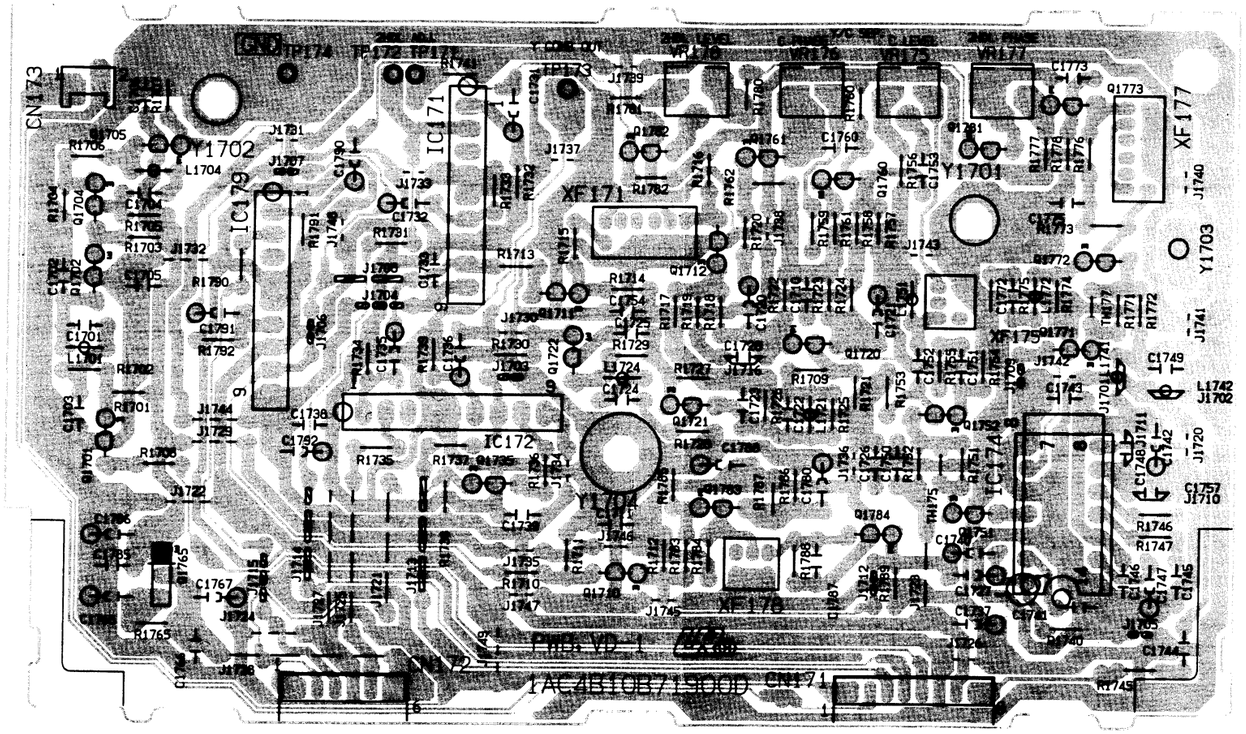
VP-1 P.W.B.



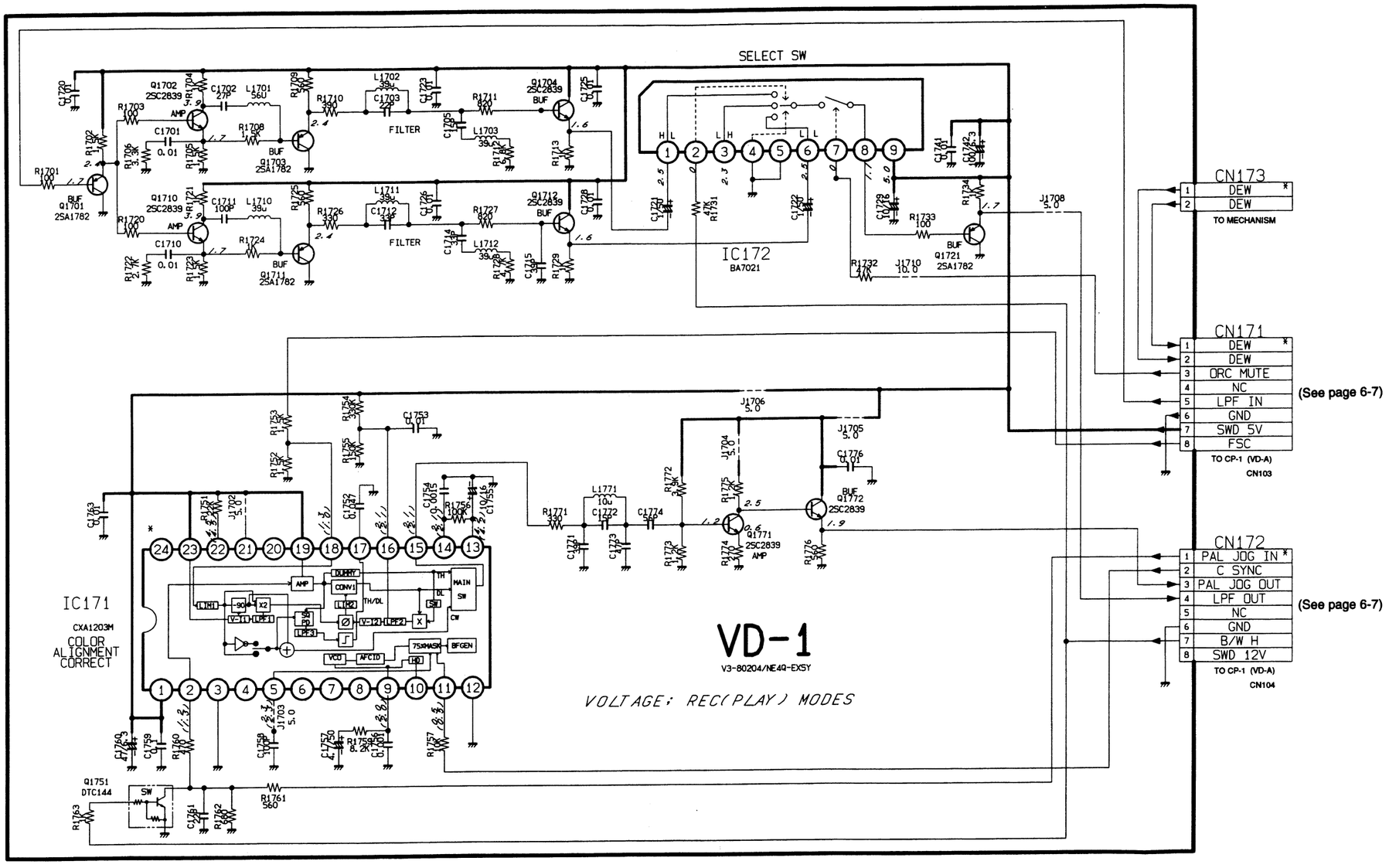


VD-1 BOARD

VD-1 P.W.B.

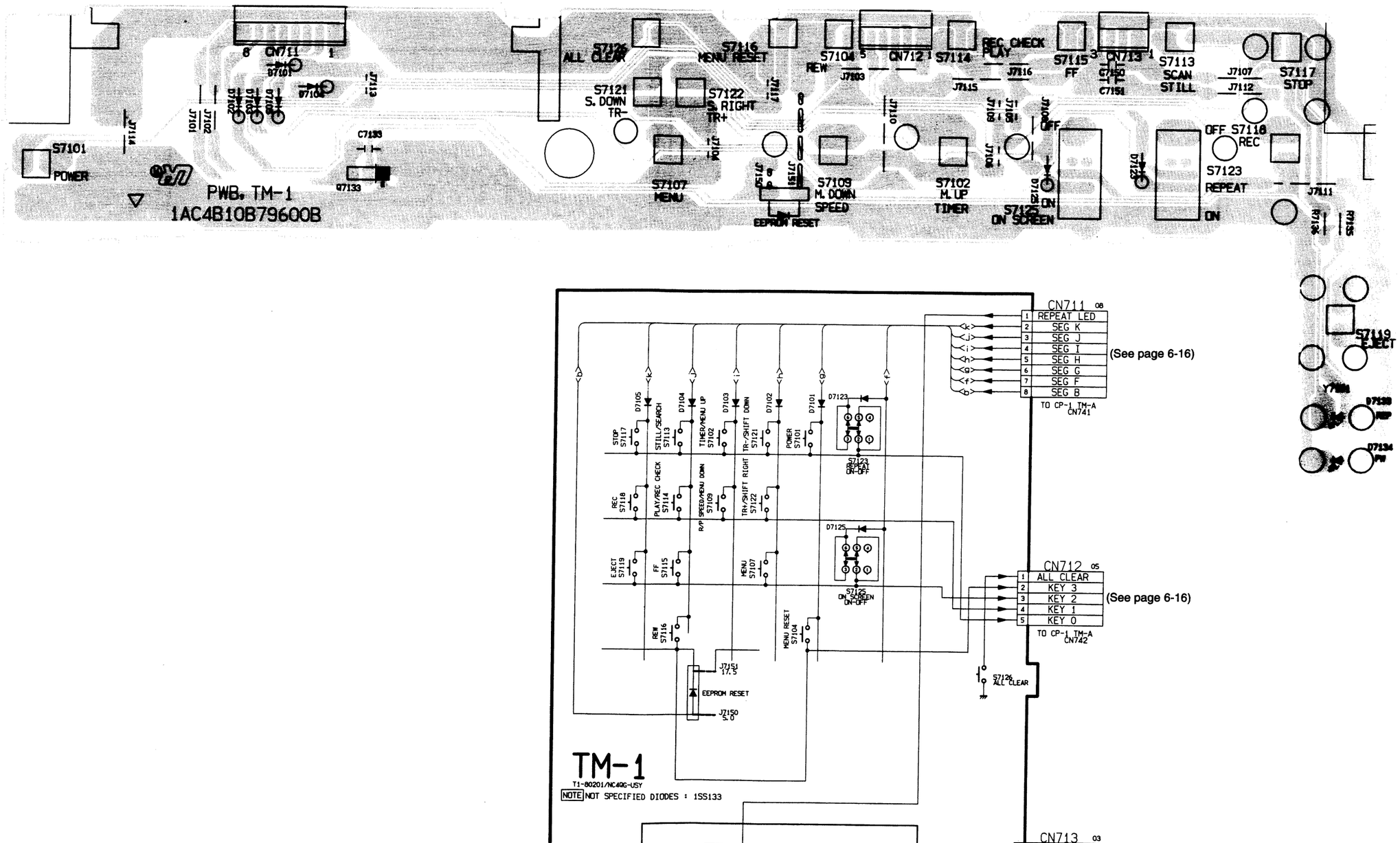


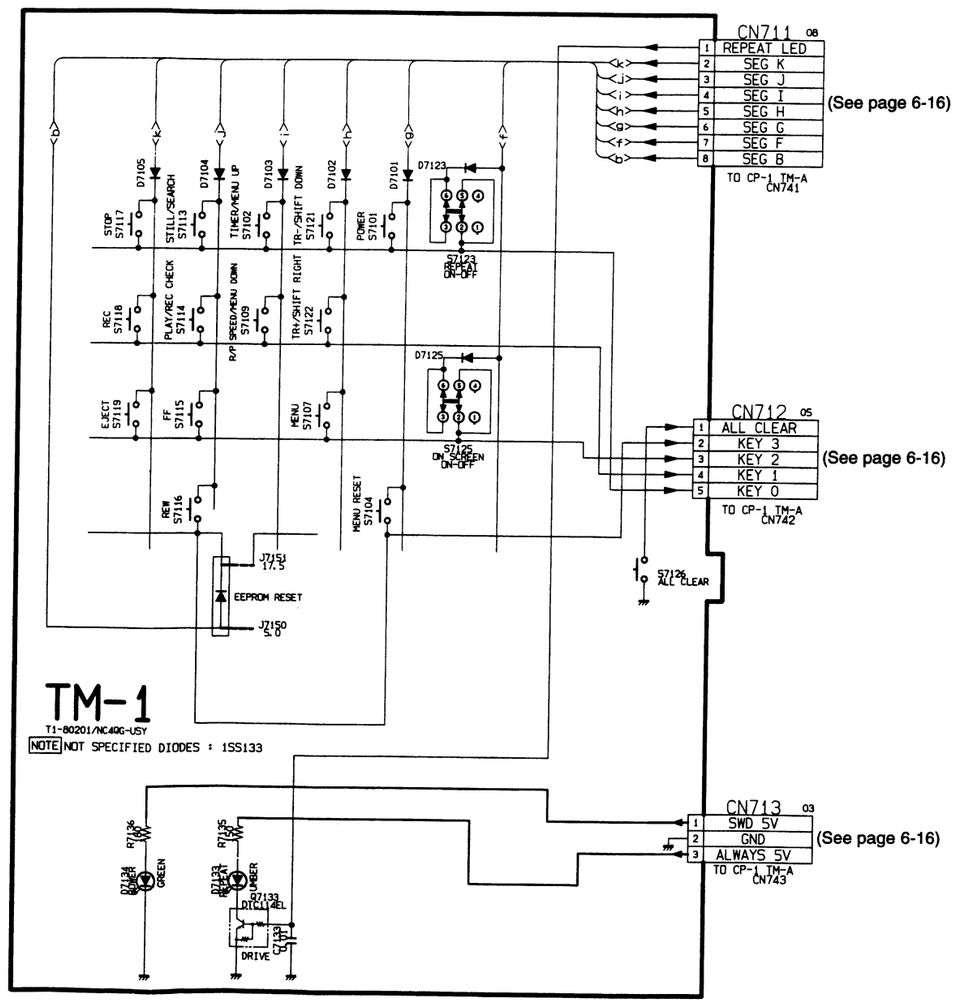
COMB FILTER


SELECT SW
IC172
BA7021
FILTER
FILTER
IC171
CXA1203M
COLOR ALIGNMENT CORRECT
VD-1
V3-80204/NE4Q-EXSY
VOLTAGE; REC(PLAY) MODES
CN173
1 DEW *
2 DEW
TO MECHANISM
CN171
1 DEW *
2 DEW
3 ORC MUTE
4 NC
5 LPF IN
6 GND
7 SWD 5V
8 FSC
TO CP-1 (VD-A)
CN103
CN172
1 PAL JOG IN *
2 C SYNC
3 PAL JOG OUT
4 LPF OUT
5 NC
6 GND
7 B/W H
8 SWD 12V
TO CP-1 (VD-A)
CN104
(See page 6-7)
(See page 6-7)

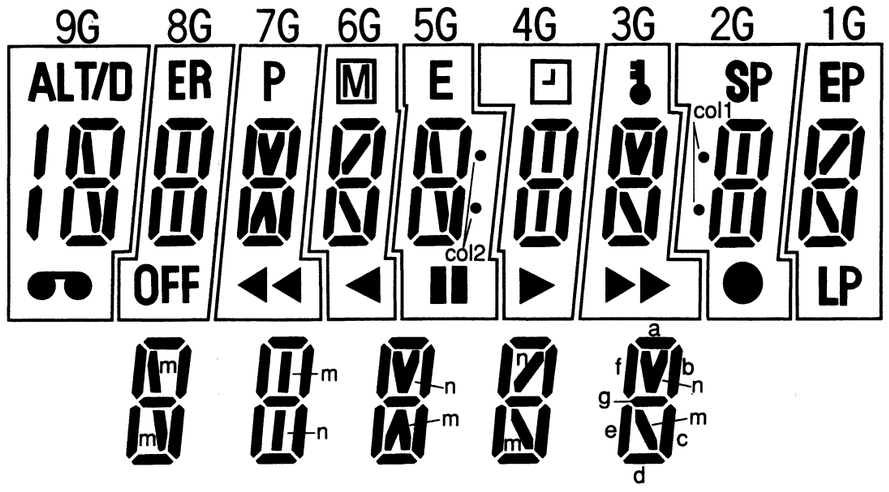
SWITCH

TM-1 P.W.B.





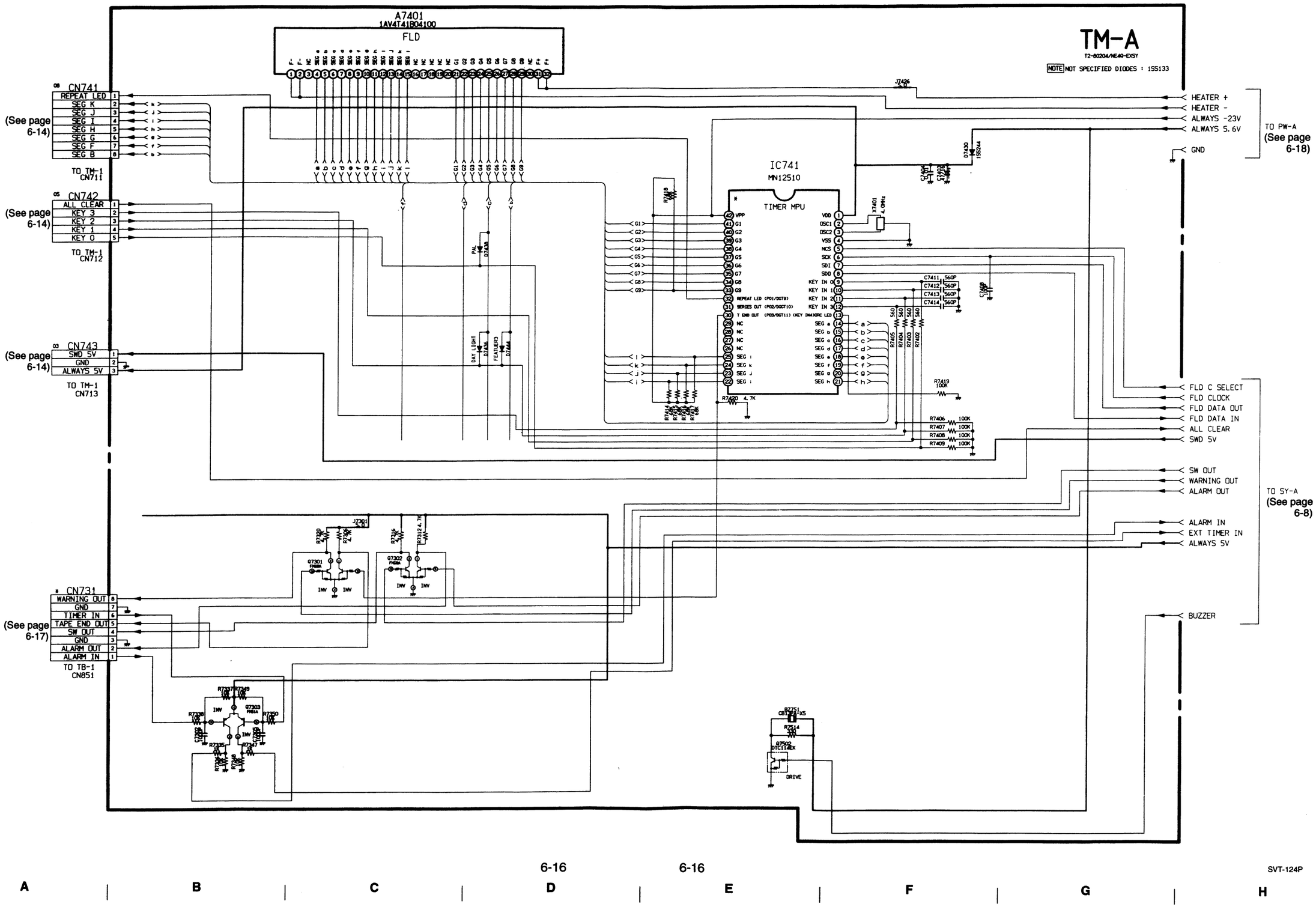
A7401 DISPLAY (FLD) GRID/ANODE ASSIGNMENT DRAWING & TABLE



seg	9G	8G	7G	6G	5G	4G	3G	2G	1G
a	AL	ER	P	M	⌐	E	🌡	SP	EP
b	n	-	n	n	-	-	n	-	n
c	a	a	a	a	a	a	a	a	a
d	b	b	b	b	b	b	b	b	b
e	c	c	c	c	c	c	c	c	c
f	d	d	d	d	d	d	d	d	d
g	e	e	e	e	e	e	e	e	e
h	f	f	f	f	f	f	f	f	f
i	g	g	g	g	g	g	g	g	g
j	m	m	m	m	m	m	m	m	m
k	T/D	-	-	-	col2	-	-	col1	-
l	📼	OFF	◀◀	◀	▮▮	▶	▶▶	●	LP

GR-04100

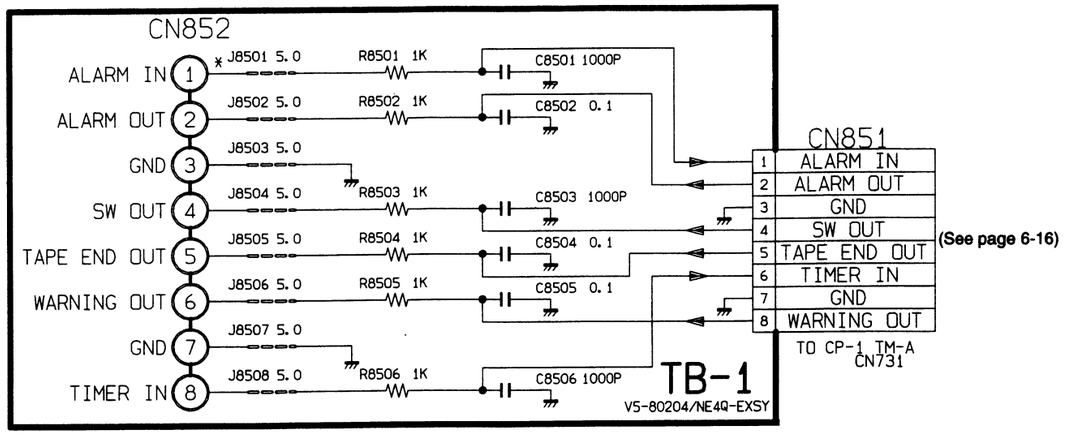
TIMER & DISPLAY (FLD)



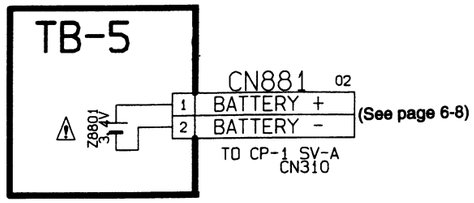
6-16 6-16

SVT-124P

BOARDS TERMINAL

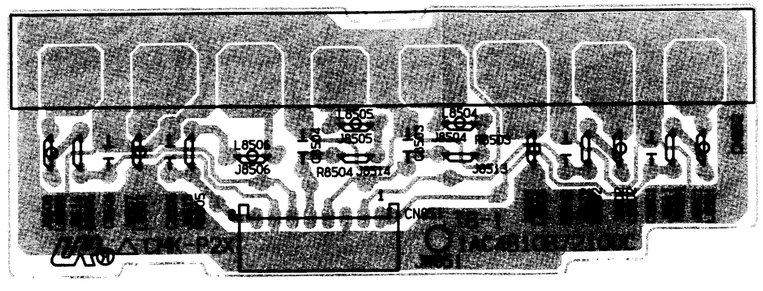


(See page 6-16)

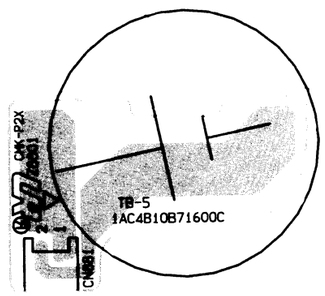


(See page 6-8)

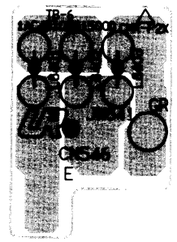
TB-1 P.W.B.



TB-5 P.W.B.

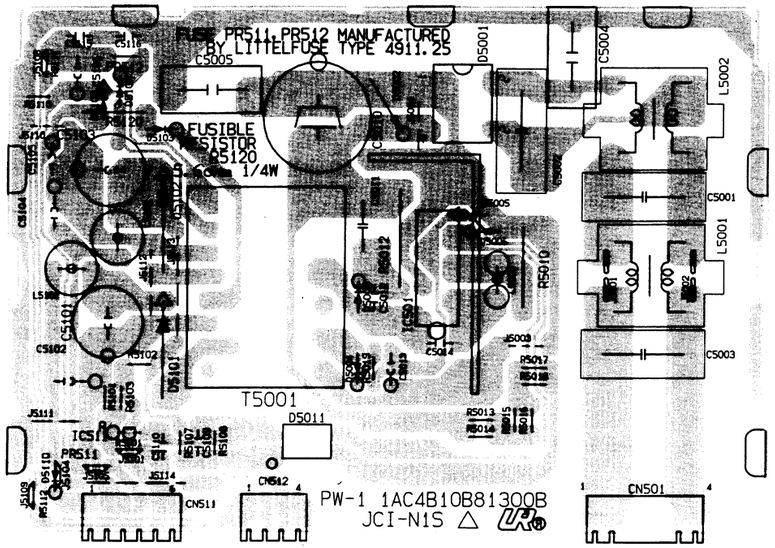


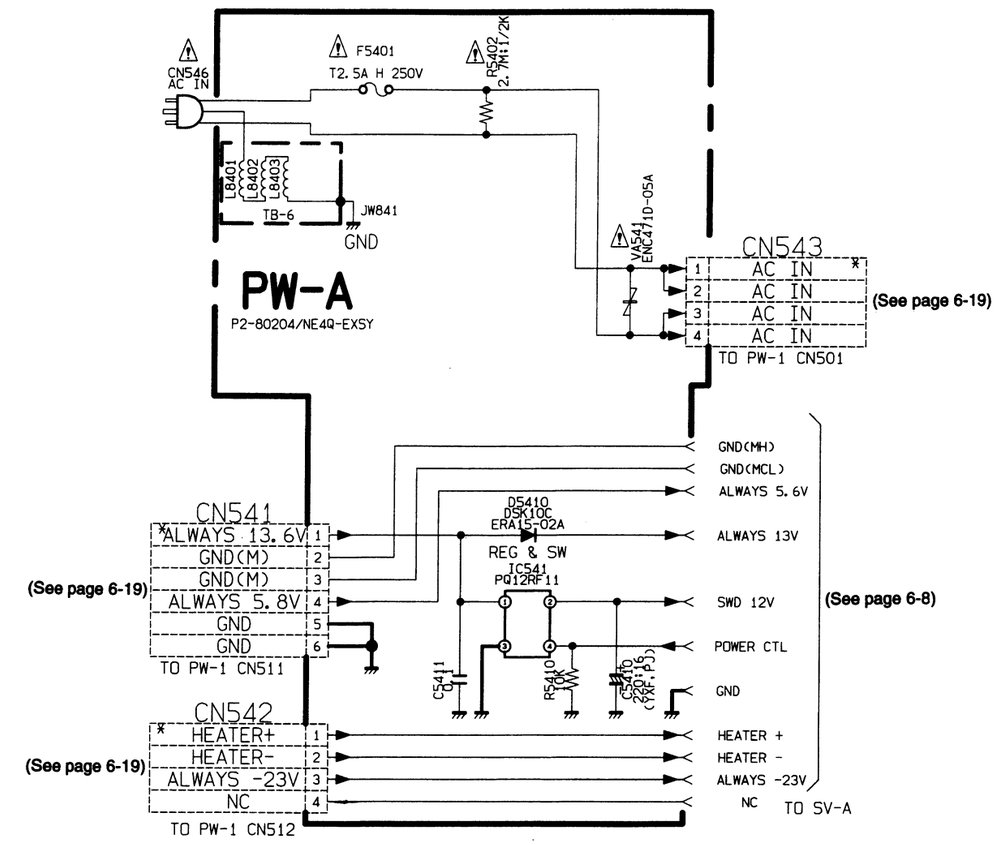
TB-6 P.W.B.



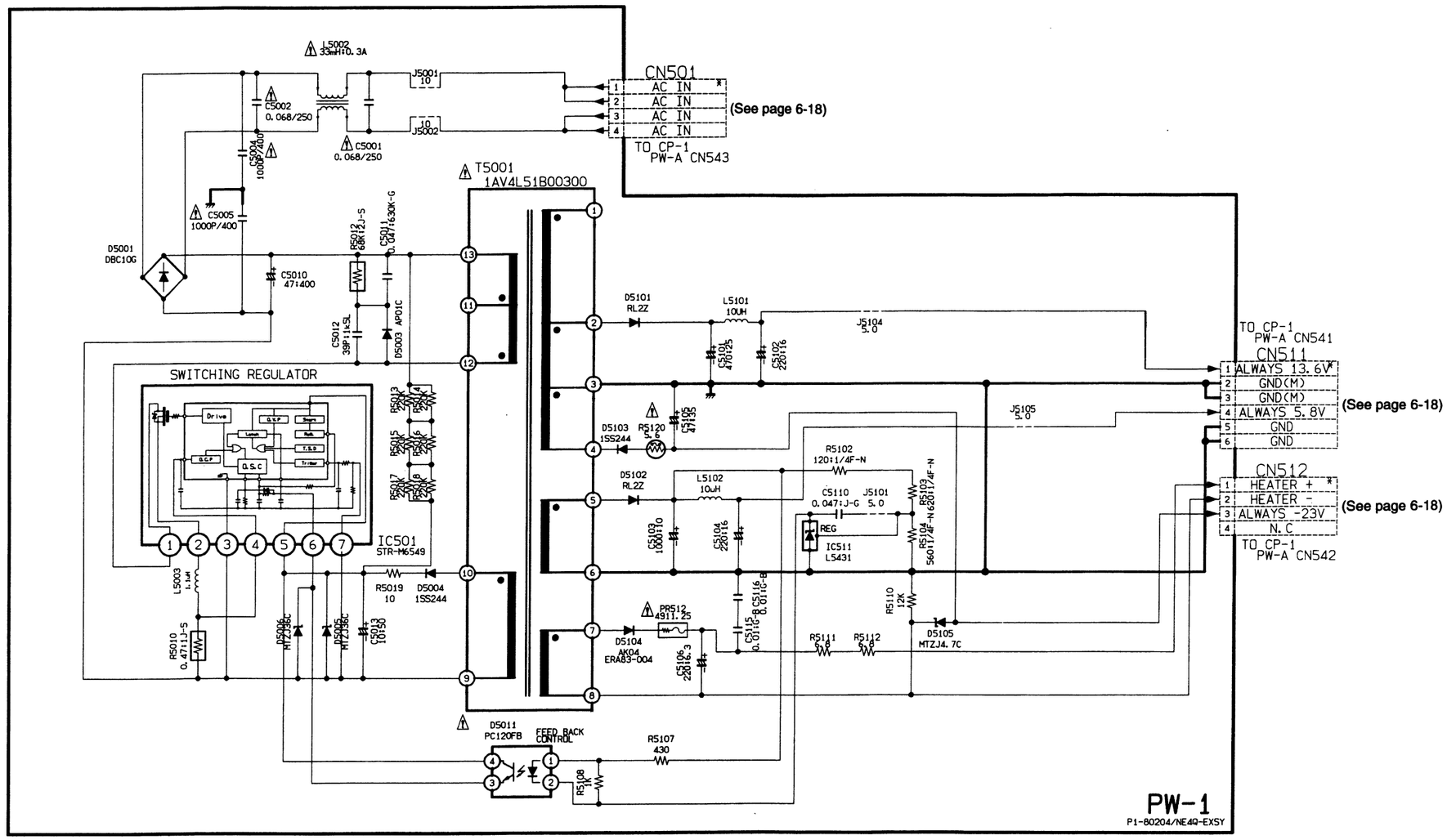
PW-1 BOARD

PW-1 P.W.B.





POWER SUPPLY



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LA6458D
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LA7374
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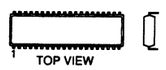
X24002PC7189



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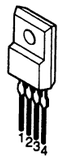

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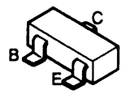
DTC343TK



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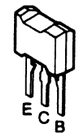

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1SS83
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APOIC-V0
EM-1Z
GMA01-BT
HZS9-1NB2
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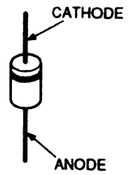
MTZJ-4.7C
MTZJ-T-77-9.1B
RL2Z-LF-C4
RZ1250
TS4030BP TSB



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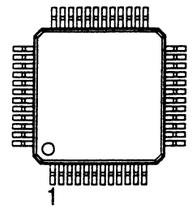
SEL2910D-TP2-D

UPD784916AGF-133-3BA



2

3

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L5431-AA

DTC114EF
DTC114EL-TL2

SEL2410GM

STR-M6549

4

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LB1643

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2SC2840-D
2SC3331-S-AA
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FMG9

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LN59L

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5

MN1381-H

FMS1

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